

## **Digital Marketing**

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## **MASTER THESIS**

ATSIMINIMO RODIKLIŲ OPTIMIZAVIMAS: REKLAMOS DAŽNIO POVEIKIS STATINIŲ REKLAMOS SKYDŲ ĮSIMINIMUI SOCIALINĖJE ŽINIASKLAIDOJE OPTIMIZING RECALL RATES: THE IMPACT OF AD FREQUENCY ON MEMORY RETENTION OF STATIC BANNER ADS ON SOCIAL MEDIA

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#### **SUMMARY**

## OPTIMIZING RECALL RATES: THE IMPACT OF AD FREQUENCY ON MEMORY RETENTION OF STATIC BANNER ADS ON SOCIAL MEDIA

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The master thesis comprises 100 pages, 21 tables, 1 figure, and 144 references.

In this thesis, the moderation of static banner ad frequency on social media pages is explored in terms of memory retention and user engagement concerning the importance of ad frequency in terms of memory recall without the detrimental effects of ad frequency. Based on theoretical frameworks like the Effective Frequency Theory and the Wear-In/Wear-Out Model, the work raises questions about how different forms of ad exposure can affect user behavior. A qualitative research approach was adopted, and focus group interviews were conducted with 12 performance marketing professionals with specific experience in Facebook Ads. Using the Saunders Research Onion framework as the theoretical framework, stakeholder demographics, timing and content, and ad personalization are critical aspects explored regarding the performance of the ads.

Steady key learnings indicate that best ad recall occurs at three to five exposures weekly, after which it drops due to PAS and ad fatigue. One astonishing factor is the role of demographics: younger people are more receptive to ads with a playful touch, and with high frequency for older people, repetitive ads work much better. This is most probably the reason why the seen ads during peak visibility times, like early evening times or on weekends, have better recall than others. Clarity of advertisement layout plays an important role in its performance degree; smooth and good-looking commercials improve memorability and credibility, while their complicated layouts tend to discourage the user. Targeting comes out as important because when the ads are targeted at a particular consumer's interests, and these ads are run more frequently, the consumer is not likely to get bored even when he remembers the ads.

The thesis presents recommendations for marketers with a specific focus on such aspects as frequency capping, content, and data-driven personalization. These insights will be particularly useful to organizations that may wish to understand how they can overcome the difficulties of reaching audiences in a crowded digital advertising environment and how to achieve sustainable audience connection and advertising effectiveness.

#### SANTRAUKA

# ATSIMINIMO RODIKLIŲ OPTIMIZAVIMAS: REKLAMOS DAŽNIO POVEIKIS STATINIŲ REKLAMOS SKYDŲ ĮSIMINIMUI SOCIALINĖJE ŽINIASKLAIDOJE

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Baigiamąjį darbą sudaro 100 puslapiai, 21 lentelė, 1 paveikslas ir 144 literatūros šaltiniai.

Šioje disertacijoje nagrinėjamas statinių reklamjuosčių skelbimų dažnumo mažinimas socialinės žiniasklaidos puslapiuose, atsižvelgiant į atminties išsaugojimą ir vartotojų įsitraukimą, atsižvelgiant į skelbimų dažnumo svarbą atminties prisiminimui be žalingo reklamos dažnio poveikio. Remiantis teorinėmis sistemomis, tokiomis kaip efektyvaus dažnio teorija ir nusidėvėjimo / nusidėvėjimo modelis, darbe keliami klausimai, kaip skirtingos skelbimų rodymo formos gali paveikti naudotojų elgesį. Buvo pritaikytas kokybinis tyrimo metodas ir buvo atlikti fokuso grupės interviu su 12 efektyvumo rinkodaros profesionalų, turinčių specifinės patirties dirbant su Facebook reklamomis. Naudojant "Saunders Research Onion" sistemą kaip teorinę sistemą, suinteresuotųjų šalių demografiniai rodikliai, laikas ir turinys bei skelbimų suasmeninimas yra svarbūs aspektai, išnagrinėti atsižvelgiant į skelbimų našumą.

Pagrindiniai mokymai rodo, kad skelbimas geriausiai atpažįstamas tris ar penkis parodymus per savaitę, o po to sumažėja dėl PAS ir skelbimų nuovargio. Vienas stulbinantis veiksnys yra demografinių rodiklių vaidmuo: jaunesni žmonės yra imlesni skelbimams su žaismingu prisilietimu ir dažnai vyresnio amžiaus žmonėms, o pasikartojantys skelbimai veikia daug geriau. Greičiausiai tai yra priežastis, kodėl didžiausio matomumo metu, pavyzdžiui, anksti vakare ar savaitgaliais, matytus skelbimus atsimena geriau nei kitus. Reklamos našumo laipsniui svarbų vaidmenį vaidina reklamos išdėstymo aiškumas; sklandžiai ir gerai atrodančios reklamos pagerina įsimenamumą ir patikimumą, o sudėtingas jų išdėstymas atgraso vartotoją. Taikymas išryškėja kaip svarbus, nes kai skelbimai yra nukreipti į konkretaus vartotojo interesus ir šie skelbimai rodomi dažniau, vartotojui greičiausiai nebus nuobodu net ir prisiminus skelbimus.

Baigiamajame darbe pateikiamos rekomendacijos rinkodaros specialistams, ypatingą dėmesį skiriant tokiems aspektams kaip dažnio ribos nustatymas, turinys ir duomenimis pagrįstas personalizavimas. Šios įžvalgos bus ypač naudingos organizacijoms, kurios gali norėti suprasti, kaip jos gali įveikti sunkumus pasiekti auditoriją perpildytoje skaitmeninės reklamos aplinkoje ir kaip pasiekti tvarų auditorijos ryšį ir reklamos efektyvumą.

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#### **INTRODUCTION**

In today's fast-paced digital environment, where the battle for consumer attention is fierce, understanding how to optimize ad recall is critical for marketers. The rapid evolution of technology and the emergence of social media platforms have completely changed the advertising industry, requiring the development of fresh approaches to capture consumers' attention effectively. Static banner ads, commonly used in online advertising, provide distinct possibilities and difficulties in this particular situation. Although these advertisements is simple, the process of optimizing their frequency to improve memory retention is a complex matter that necessitates extensive research (Li & Lo, 2020; Wang, Xu, & Chan, 2020; Chaffey & Ellis-Chadwick, 2019).

This research is highly relevant due to recent changes in digital advertising methods. Companies are progressively utilising data analytics to customise advertising experiences and optimise user engagement. Nevertheless, achieving an optimal equilibrium in the ad frequency to prevent ad fatigue while guaranteeing effective recall is a delicate task. Research has indicated that modest advertisement frequency can greatly improve memory retention, but excessive exposure tends to result in reduced effectiveness and user annoyance. This balance is essential when considering static banner ads, which do not possess the interactive features of dynamic or video ads but can nevertheless serve as powerful instruments for strengthening brand identity (Chen & Hsieh, 2020; Jin & Ryu, 2018; Wang et al., 2020).

The COVID-19 pandemic has heightened the significance of digital advertising as firms shift towards online channels to connect with their target customers. The current change has accelerated the necessity to understand the effects of various advertisement frequencies on consumer memory and engagement on social media. Static banner advertising has become increasingly common due to their cost-effectiveness and convenience of distribution. Nevertheless, the success of these methods depends on a careful control of exposure rates to sustain user engagement without overloading them (Chaffey & Ellis-Chadwick, 2019; Bakker & Rickard, 2018; Dehghani et al., 2016).

Empirical research highlights that the quality of ad content plays a pivotal role in determining the optimal frequency for static banner ads. Visually appealing graphics and persuasive messages are more likely to be recalled and can withstand more frequent exposure without causing ad fatigue (Bleier & Eisenbeiss, 2015). On the other hand, advertisements that are of bad quality or have a poor design can easily become annoying, even when shown to people less frequently (Jin & Ryu, 2018; Chen & Hsieh, 2020). The relationship between the quality of content

and the frequency of ads is an important subject of research that can provide insights for developing more impactful advertising tactics.

Moreover, the personalization of ads has emerged as a significant factor in enhancing memory retention. Studies suggest that customised advertisements, designed to match specific consumer tastes and behaviours, can greatly enhance the ability to remember information. These advertisements are considered to be more pertinent and captivating, enabling more frequent viewings without the adverse consequences linked to ad weariness (Bleier & Eisenbeiss, 2015; Lee, Hosanagar, & Nair, 2018; Wang et al., 2020). Integrating data-driven personalisation into static banner ad campaigns could enhance their effectiveness.

The concept of ad fatigue, which is especially pertinent to static banner ads, highlights the importance of ad frequency management. Excessive exposure can result in heightened user irritation and reduced user interaction, as evidenced by research on digital ad performance (Wiese & Döring, 2021; Tucker, 2019). By implementing frequency capping, which involves restricting the number of times an advertisement is displayed to a single user, it is possible to reduce the adverse impacts and ensure consistent high recall rates over an extended period of time (Stocchi, Driesener, & Nenycz-Thiel, 2019).

Longitudinal studies are essential to understanding the sustained impact of ad frequency on memory retention. Although a moderate frequency of advertisements can improve short-term memory, regular and carefully timed exposure to advertisements shapes customers' loyalty to a brand and their purchasing habits. As emphasised by Li and Lo (2020), Dehghani et al. (2016), and Chen and Hsieh (2020), it is crucial to establish long-term methods that take into account both instant recall and persistent engagement.

#### Novelty of the Topic

Although much research has explored the general impacts of ad frequency on consumer memory retention, the specific effects on static banner ads within the context of social media remain under-examined. While previous studies have highlighted the importance of ad frequency in enhancing recall rates, they often focus on dynamic and video ads (Chen & Hsieh, 2020; Jin & Ryu, 2018). This study examines the frequency optimization for static banner ads to improve memory recall without inducing ad fatigue, notwithstanding their simplicity. Furthermore, although previous research recognises that ad effectiveness can be enhanced by high-quality and personalised content (Lee, Hosanagar, & Nair, 2018; Wang, Xu, & Chan, 2020), the relationship between these variables and ad frequency, particularly for static banner ads, lacks sufficient documentation. This study seeks to address this gap by investigating the ability of personalised static banner ads to maintain greater frequencies without prompting negative user responses, so offering a more comprehensive understanding of the impact of content quality on optimising ad frequency. Moreover, the cognitive dimensions of advertising, namely the impact of varying advertisement frequencies on user memory on social media platforms, have not been extensively explored. Social media is characterised by its own set of user behaviours and interaction patterns, which differ from those found on traditional digital platforms (Chen & Hsieh, 2020). Understanding how these dynamics influence the effectiveness of static banner ads is crucial for developing more targeted and effective advertising strategies (Wang et al., 2020).

#### The problem of the Master Thesis

What is the impact of varying frequencies of static banner ads on memory retention among different user demographics on social media, and how do ad characteristics and contextual settings influence this relationship?

#### The aim of the Master Thesis

To evaluate the impact of ad frequency on memory retention and recall rates of static banner ads on social media.

#### The objectives of the Master Thesis.

- 1. Analyze scientific literature on ad frequency, memory retention, recall rates, and the effectiveness of static banner ads on social media.
- 2. Investigate the relationship between ad frequency and memory retention/recall rates in previously conducted scientific research.
- 3. Create a conceptual model of ad frequency, memory retention, and recall rates in the context of static banner ads on social media.
- 4. Based on the conceptual model, conduct empirical research, and provide the results.
- 5. Based on empirical research, provide conclusions and recommendations.

The thesis is structured to systematically address the research objectives and provide a clear pathway through the study's findings and analysis. The introductory chapter outlines the problem statement, research questions, and the importance of the study within its academic and practical context. The second chapter delves into a critical review of relevant literature, presenting key theoretical frameworks and existing research to establish the foundation for the study. The third chapter explains the research design and methodology, detailing the qualitative tools employed to gather and analyze data while adhering to the rigor required for empirical investigation. The fourth chapter focuses on presenting the results, offering a detailed exploration of the data through thematic analyses, and theoretical validation. The discussion in the fifth chapter links these findings to the existing literature and the research questions, highlighting their implications for both theory and practice. The concluding chapter synthesizes the main insights, acknowledges limitations, and proposes actionable recommendations and avenues for future research. This structure ensures a coherent, analytical, and practical approach, guiding the reader seamlessly through the complexities of the research and its broader implications.

#### LITERATURE ANALYSIS

## 2.1 Theoretical Aspects Of Advertising Frequency, Memory Retention, And Static Banner Ads On Social Media

#### 2.1.1 Advertising Frequency Concept

#### 2.1.1.1 Definition and Measurement of Ad Frequency

Ad frequency is a crucial metric in advertising and marketing that quantifies the number of times an individual is exposed to a certain message or ad within a specified period of time. This metric is very important for understanding the impact and effectiveness of advertising campaigns. According to Rossiter and Percy (1997), the frequency of advertisements plays a crucial role in the process of how consumers respond to advertising. It affects their ability to remember and recognise the advertisements, as well as their subsequent behaviour.

Ad frequency and reach are two separate and important metrics in advertising. Reach refers to the total number of unique persons who are exposed to an advertisement, whereas frequency measures the average number of times each individual within the target audience is exposed to the advertisement (Tellis, 2004). Advertisers must carefully manage the scope and intensity of their ads to achieve a balance between reaching a wide audience and providing detailed information. A campaign that has a wide audience but is shown infrequently may not successfully strengthen the advertising message. On the other hand, a campaign that is shown frequently guarantees recurrent exposure, which could result in better recall and consumer response (Schmidt & Eisend, 2015).

Ad frequency measurement is crucial for optimising advertising campaigns. The calculation of ad frequency traditionally involves the formula Frequency = (Total Number of Impressions / Reach). In this context, the total number of impressions represents the overall number of times an advertisement is displayed. At the same time, reach refers to the total number of unique individuals exposed to the advertisement (Belch & Belch, 2004).

Diverse methodologies and instruments quantify the frequency of advertisements across various media platforms. Nielsen ratings in television advertising offer information on how often various demographics are exposed to advertisements (Nielsen, 2020). Google Ads and Facebook Ads Manager provide comprehensive data on ad frequency in digital advertising by monitoring impressions and unique users (Facebook Business, 2021; Google Ads, 2021).

Measuring ad frequency on digital platforms typically requires advanced tracking techniques that monitor how users engage with adverts. These platforms utilise cookies and other tracking technology to quantify the frequency with which a user is exposed to an advertisement (Hoban & Bucklin, 2015). Tracking user behaviour allows marketers to establish frequency caps, which restrict the number of times an advertisement is displayed to a particular user. This measure prevents ad fatigue and guarantees a favourable user experience (Lambrecht & Tucker, 2013).

The introduction of big data and machine learning has enabled advanced measuring techniques, enabling more detailed analysis of ad frequency and its influence on customer behaviour. Machine learning algorithms can analyse large quantities of data to identify the ideal frequency that maximises user engagement and conversion rates while avoiding user irritation (Chung et al., 2014).

Another method for quantifying ad frequency entails utilising exposure surveys or questionnaires, in which users document their exposure to commercials throughout a specific timeframe. While this approach can offer significant perspectives, it is frequently less dependable because of the influence of recall bias and the potential for mistakes in self-reporting (Vakratsas & Ambler, 1999).

The measurement of advertising frequency is a constantly changing area that progresses alongside technological improvements. Accurate measurement is crucial for advertisers to achieve the optimal balance between adequate exposure to reinforce the advertising message and avoiding excessive repetition, which may decrease returns and customer annoyance (Schmidt & Eisend, 2015).

Different factors influence the optimal ad frequency for a campaign. The nature of the advertised product or service is a crucial determinant. High-involvement products, like vehicles or electronics, may necessitate a greater frequency of persuasion to influence potential purchasers, whereas low-involvement products, such as household items, may achieve satisfactory outcomes with a lower frequency of persuasion (Krugman, 1972). Furthermore, the advertising medium is crucial. The ability of various media to maintain audience interest and communicate recurring topics without making viewers tired varies. Television and radio commercials typically require a higher frequency since they are short-lived, but print and digital ads can have a lower frequency because they are exposed for a longer period of time (Vakratsas & Ambler, 1999).

#### 2.1.1.2 Theoretical Models of Advertising Frequency

One of the earliest and most influential models is the Three-Exposure Hypothesis, proposed by Herbert Krugman (1972). According to Krugman, three exposures are necessary for an advertisement to be effective: the first to create awareness, the second to provide the message's relevance, and the third to remind the consumer. Krugman posited that additional exposures beyond three have diminishing returns on effectiveness.

Building on Krugman's hypothesis, Effective Frequency Theory suggests that a minimum number of exposures is required to achieve a marketing objective. This number is often cited as three, though the optimal number may vary depending on the product and market conditions (Tellis, 1997). This theory is central to planning advertising schedules, balancing the need to avoid underexposure (ineffectiveness) and overexposure (wear-out).

The Wear-In/Wear-Out Theory is another important concept that looks at the relationship between exposures and the effectiveness of advertising over time. This hypothesis states that while initial exposures (wear-in) boost consumer familiarity and efficacy, further exposures (wear-out) might eventually result in decreased effectiveness and even unfavorable reactions because of aggravation (Pechmann & Stewart, 1988). This model emphasizes how crucial it is to determine the ideal frequency in order to prevent overexposure.

John Philip Jones's (1995) Recency Theory provides an alternative viewpoint. This theory contends that the final exposure before a purchase decision exerts the most important influence. According to this approach, which places more emphasis on the time of exposures than their frequency, ongoing advertising guarantees that the consumer will still be thinking about the commercial when they make a purchase choice. Therefore, this hypothesis supports more continuous but lower-frequency advertising to preserve message recency.

Ostrow's model is a useful method for determining effective frequency. The model takes into account several variables that affect frequency requirements, including the media environment, message complexity, and market competitiveness (Ostrow, 1984). By accounting for these different aspects, the model provides a systematic method for determining the right frequency, providing advertisers with a more tailored approach.

The Adstock Model, developed by Simon Broadbent (1979), is another important theoretical model. It measures the prolonged effect of advertising on consumer behavior, acknowledging that an advertisement's impact diminishes over time but can be "stocked" in the consumer's memory. The Adstock effect is calculated using a decay rate, which indicates how

quickly the effect of an advertisement wears off. This model helps in understanding the cumulative impact of advertising and planning the frequency to maintain an effective level of consumer awareness and recall.

Duplication of Exposure Theory addresses the overlap of audiences across different media and times, positing that consumers often encounter the same advertisement multiple times across various platforms (Naples, 1979). This theory suggests that effective frequency should account for these overlaps to avoid excessive repetition and wastage of advertising budget.

#### **2.2.1 Memory Retention Theoretical Aspects**

#### 2.2.1.1 Cognitive Processes Involved in Memory Retention

Memory retention is a complex cognitive process involving several stages and mechanisms that enable the encoding, storage, and retrieval of information. Understanding these mechanisms is important for investigating the formation and preservation of memories.

Encoding is the initial and essential process in memory formation, which involves converting sensory information into a format that can be stored in the brain. Craik and Lockhart (1972) found that the level of processing during encoding had a considerable effect on memory retention. The Levels of thinking Theory posits that engaging in profound, semantic thinking results in superior retention compared to engaging in superficial, surface-level processing. Elaborative rehearsal, characterised by meaningful association, improves the effectiveness of encoding in comparison to simple repetition.

Storage is the process of preserving encoded information for a period of time. The Multi-Store Model, proposed by Atkinson and Shiffrin in 1968, suggests that memory storage consists of three separate stages: sensory memory, short-term memory, and long-term memory. Sensory memory is a temporary storage system that enables perceptual processing. Short-term memory, also known as working memory, has a restricted capacity and length. It normally holds information for approximately 20 seconds without any type of rehearsal, according to Baddeley (2000). Longterm memory, in contrast, has the ability to hold an endless amount of information for an unending period of time. This is demonstrated in Table 1, which outlines the several stages of memory storage according to Atkinson and Shiffrin's Model.

Consolidation refers to the process of solidifying a memory trace following its initial acquisition. This process is essential for memory maintenance and involves transforming fleeting memories into permanent ones. Consolidation occurs on two levels, according to McGaugh

(2000): the synaptic level, where changes in synaptic strength occur, and the systemic level, where the hippocampus is essential. Both rapid eye movement (REM) and non-rapid eye movement (non-REM) sleep stages have been shown to contribute to the reinforcement of memory traces, supporting the idea that sleep facilitates consolidation (Diekelmann & Born, 2010).

Retrieval refers to the act of obtaining previously stored information. The successful retrieval of information relies on the encoding process's efficiency and the memory trace's robustness. Tulving's (1974) Encoding Specificity Principle states that memory recall is more efficient when the environmental conditions during the encoding process align with the conditions during retrieval. This principle highlights the importance of contextual cues in supporting memory retrieval. Additionally, it has been demonstrated that retrieval practice of regularly recalling information improves long-term memory. Table 2, which lists the several factors that affect memory retrieval, illustrates this phenomenon, known as the testing effect.

Different brain structures and neurotransmitters influence neurobiological foundations of memory retention. The hippocampus is important for creating and retrieving explicit memories, whereas the amygdala plays a pivotal role in preserving emotional memories (Squire, 2004). Neurotransmitters like acetylcholine and glutamate play a crucial role in synaptic plasticity, which is the process responsible for learning and memory (Bliss & Collingridge, 1993).

Several factors, including deterioration, interference, and retrieval failure, can contribute to forgetting, which is the progressive loss of information over time. According to the Interference Theory, introducing new information may interfere with recalling previously learned material. This interference can occur in two main ways: proactive interference, where prior learning affects the ability to learn new information, and retroactive interference, where new learning affects the ability to recall old information (Postman & Underwood, 1973).

Recent progress has also emphasised neurogenesis's significance in memory preservation in the hippocampus. Epp, Haack, and Galea (2021) examined the role of adult neurogenesis in the hippocampus about memory flexibility and the capacity to differentiate between comparable memories. This process is considered essential for incorporating new information into existing memories, hence improving memory retention and precision.

#### 2.2.1.2 Factors Influencing Memory Retention

Various factors influence memory retention in advertising, affecting how consumers encode, store, and retrieve information. These qualities are essential for creating impactful advertising that has a lasting effect on customers. The use of emotional content in advertisements can greatly improve the ability to remember information. Riemer and Noel (2020) discovered that emotionally stimulating advertising appeals enhance long-term memory retention, especially when the amount of arousal aligns with the advertisement's claim. This statement emphasises the significance of aligning emotional intensity with the message's content to improve long-term memory retention (Riemer & Noel, 2020).

The effectiveness of an advertisement can be influenced by its context. Kwon et al. (2019) established that the media environment substantially impacts the retention of advertising information. Advertisements placed in relevant and engaging media environments are more likely to be recalled than those placed in less engaging situations. This effect emphasizes the significance of selecting appropriate media platforms for advertising efforts (Kwon et al., 2019).

Utilising retrieval cues can greatly improve memory retention for commercials. Keller (1987) shown that advertising retrieval cues, such as verbal or visual components of the advertisement, enhance the ability to recall the advertisement and influence judgements of the brand. Including familiar aspects in commercials can enhance the chances of remembering them (Keller, 1987).

The timing and frequency of advertising exposures are important factors in memory retention. In their study, Heflin and Haygood (1985) discovered that advertising schedules that were spread out over one to three weeks led to greater levels of brand recall and identification, compared to schedules that were focused within a single day or spread out over five weeks. The discovery emphasises the efficacy of spaced repetition in improving the retention of long-term memory (Heflin & Haygood, 1985).

Repetition is a widely acknowledged aspect that impacts the ability to remember information. Repeated exposure to an advertisement enhances the probability of its remembrance. According to the spacing effect, information is more likely to be remembered when it is spread out over time as opposed to being delivered repeatedly in a brief amount of time (Smolen, Zhang, & Byrne, 2016). The memory trace is strengthened and made easier to retrieve by repetition. This is demonstrated in Table 3, which presents the impact of repetition on memory as described by Smolen, Zhang, and Byrne (2016).

In their study, Detera et al. (2017) examined how varying animation speeds impact the ability to remember information in online banner ads. The researchers discovered that increasing the animation rates had a substantial positive impact on memory recall for the promoted products,

in contrast to slower speeds. According to Detera et al. (2017), the presence of dynamic features in an advertisement can better attract and hold the attention of consumers.

Social presence can impact the retention of advertising information. Puntoni and Tavassoli (2007) discovered that when individuals are in the presence of others, their concerns about appearing socially desirable can improve their ability to remember advertisements that are considered socially desirable. According to Puntoni and Tavassoli (2007), the social environment in which an advertisement is seen can affect how well it is remembered. This is explained in Table 4, which lists the several aspects that influence the ability to retain advertising information.

#### 2.1.3 Impact of Ad Frequency on Memory Retention

#### 2.1.3.1 Empirical Studies on Ad Frequency and Memory Retention

Stewart and Furse (1986) conducted a foundation study on the relationship between ad frequency and memory retention. Their research investigated how various levels of ad exposure impact brand recall. It was discovered that both low and high frequencies of advertisement exposure can impact memory recall. Still, there exists an ideal range where the effectiveness of the advertisement reaches its highest point. According to their research, a moderate frequency of three to ten exposures is recommended to optimise recall without inducing wearout (Stewart & Furse, 1986).

The phenomenon known as the spacing effect, which refers to the improved retention of information when adverts are presented at intervals across time rather than in a concentrated manner, has been extensively established. Hintzman's study in 1974 provides evidence that spaced repetitions result in superior recall as compared to massed presentations. The reason for this phenomenon can be attributed to the higher probability of advertisements being comprehensively analysed when they are sent at intervals (Hintzman, 1974).

In a recent study by Schmidt and Eisend (2015), a meta-analysis was performed to determine the ideal advertising frequency for improving memory recall. The researchers determined that the ideal number of exposures falls between three and ten, which is consistent with previous discoveries. According to Schmidt and Eisend (2015), their investigation demonstrated that excessive repetition can result in ad wear out, a situation where further exposures no longer enhance recollection and may even have a negative effect.

Riemer and Noel (2020) examined the impact of emotional arousal on the ability to remember advertisements. A study revealed that emotionally stimulating advertisements greatly

improve long-term memory recall, especially when the emotional intensity aligns with the substance of the advertisement. The research conducted by Riemer and Noel (2020) indicates that advertisements that elicit a powerful emotional reaction have a higher probability of being retained in the memory of consumers for a longer duration.

Godden and Baddeley (2015) conducted a study on the Encoding Specificity Principle, which demonstrates that memory recall is enhanced when the environmental conditions during retrieval are similar to those during encoding. Their research shows that placing advertisements in places that resemble the locations where purchase decisions are made can improve memory retention. This is demonstrated in Table 5, which presents a concise overview of the main findings regarding the relationship between ad frequency and memory retention.

#### 2.1.3.2 Frequency Effects on Different Types of Memory

The frequency of exposure to advertisements has different effects on various forms of memory. The many categories of memory are sensory memory, short-term memory (STM), and long-term memory (LTM), each having distinct features and ability to retain information.

Sensory memory is the shortest-term element of memory, capturing fleeting sensory impressions from the environment. The duration of iconic memory, which pertains to visual stimuli, is less than one second, while the duration of echoic memory, which pertains to auditory stimuli, is a few seconds. The main function of sensory memory is to selectively exclude irrelevant information, enabling significant facts to be transferred to short-term memory (STM). Regular exposure can facilitate the transfer of pertinent information from sensory memory to short-term memory (STM). However, due to its temporary nature, mere repetition alone is inadequate for retaining information without additional cognitive processing (Cowan, 2017).

Short-term memory (STM) has a limited capacity and endurance, usually retaining knowledge for approximately 20 seconds and able to store  $7\pm2$  items (Miller, 1956). The impact of frequency on short-term memory (STM) is substantial, as frequent exposure can improve the ability to retain information within this restricted timeframe. Nevertheless, in the absence of practice or thorough processing, information stored in short-term memory (STM) is rapidly forgotten. Repeated advertisements can assist in maintaining brand or product knowledge in short-term memory (STM), increasing the likelihood of it being transferred to long-term memory (LTM), as shown by Peterson and Peterson (1959). Table 6 displays the attributes of short-term memory.

Long-term memory (LTM) possesses an unlimited capacity and has the ability to retain information indefinitely. Consolidation and rehearsal are processes that aid in transferring information from short-term memory (STM) to long-term memory (LTM). Because repeated exposures can strengthen memory traces and make recall easier, frequency substantially affects long-term memory (LTM). According to a study by Schmidt and Eisend (2015), watching advertisements more than once may help people remember and recognize a brand—two critical components of long-term memory. Nevertheless, excessive exposure can result in wear-out, a phenomenon in which repeated instances lead to reduced efficacy and possible adverse reactions (Pechmann & Stewart, 1988).

Declarative memory, which is a form of long-term memory (LTM), encompasses both episodic memories (related to personal experiences) and semantic memories (related to general information). Repeating information strengthens semantic memory by consolidating the associations between ideas and information. Repeated exposure to an advertisement aids in incorporating product qualities and benefits into the consumer's semantic memory (Squire, 2004). Repeated exposure to emotionally appealing advertisements can enhance episodic memory, forming vivid and personal memories linked to the brand (Tulving, 1972).

Implicit memory encompasses procedural memory, which refers to the acquisition and retention of skills and habits, and priming, which involves the facilitation of processing certain stimuli due to prior exposure. Priming refers to the process of being exposed to a stimuli that affects how we respond to a later stimulus. Repeated exposure to commercials can lead to priming effects, which result in increased recognition and preference for recognisable brands due to repeated, subconscious exposure (Graf & Schacter, 1985). Procedural memory is not as directly affected by the frequency of advertisements. However, constant branding and advertising can contribute to forming consumer habits, such as favouring a specific brand due to familiarity. This is supported by Schacter's research in 1987, as presented in Table 7, which provides information on the various forms of long-term memory and their relationship to frequency effects.

Emotion is essential for the process of retaining memories. Advertisements that elicit intense emotions are more prone to being retained in memory. In their study, Schwabe and Wolf (2016) discovered that the experience of emotional arousal when viewing ads improves the process of memory consolidation. This finding suggests that emotional commercials can be more impactful and effective, even when shown fewer times. The influence of emotion on memory is evident in both short-term memory (STM) and long-term memory (LTM), since emotionally stimulating advertising generate enduring impressions that are easily remembered.

#### 2.1.3.3 The Role of Repetition in Advertising Recall

In a study by Schmidt and Eisend (2015), a meta-analysis was performed to investigate the most effective advertising exposure frequency that elicits the highest consumer response. It was discovered that the ability to remember information increases in a straight line and does not reach a plateau until the eighth time the information is encountered. The study suggests that approximately ten exposures are needed to maximize recall without causing wearout (Schmidt & Eisend, 2015).

Within digital advertising, the Effective Frequency Theory posits that a specific quantity of exposures is necessary for an advertisement to achieve its desired impact. Goldstein, McAfee, and Suri (2013) conducted a study on Facebook advertising and determined that the ideal number of exposures for brand recall and engagement is between three and five. Outside of this range, more exposures resulted in reduced benefits and the possibility of ad fatigue.

Singh et al. (1994) investigated the impact of altering the interval (lag) between repeats of advertisements. Their findings suggest a considerable increase in recollection when longer time intervals are used in the condition with a long delay between measurements. Conversely, there is a greater recall rate when shorter time intervals are used in the condition with a short delay between measurements. This statement provides support for the encoding variability theory, which suggests that spaced repetitions improve memory retention by allowing the use of various contextual signals to aid in recall (Singh et al., 1994).

Burke and Srull (1988) investigated the impact of competitive interference on the repetition of advertisements. The researchers discovered that the act of repeating information had a beneficial impact on memory retrieval, but only in cases where there was minimal or no promotion of comparable products. In competitive environments, additional repetitions of an ad did not significantly enhance recall due to interference from competing ads (Burke & Srull, 1988).

In their study, Yaveroglu and Donthu (2008) investigated the efficacy of recurring diverse executions compared to single executions of banner ads in online settings. They found that ad repetition leads to greater brand name memory and intention to click. According to Yaveroglu and Donthu (2008), in situations when there is no competition, using different advertisements repeatedly improves people's ability to remember them. However, in competitive circumstances, it is more effective to repeat a single advertisement.

In a study on the spacing effect in advertising, Appleton-Knapp et al. (2005) found that repetitions spaced out boost recall of print advertisements. According to the study, memory recall

may be enhanced by changing contextual cues, such as the format and content of commercials. However, this improvement is only shown when the changes are not too frequent, as frequent changes may impede the recall of previous presentations (Appleton-Knapp et al., 2005). In contrast to massed repetition, which entails several exposures in a brief period of time, Ho, Nguyen, and Vu (2020) discovered that using spaced repetition, which distributes ad exposures throughout time, significantly improves recall. This suggests that ads might be made more successful by carefully planning when to position them.

Utilising repetition and incorporating emotional content can amplify the ability of advertisements to be remembered on digital platforms. Pham and Avnet (2015) found that YouTube advertising with powerful emotional appeals required fewer repetitions to obtain high levels of recall, in comparison to neutral ads. The reason for this is because individuals are successfully captivated by emotional material, which leads to deeper memories. Table 8, which provides a succinct summary of the effect of recurrence on advertisement memory, illustrates this.

#### 2.2 Static Banner Ads: Design And Effectiveness

#### 2.2.1 Static Banner Ads Overview

Static banner ads are characterised by their utilisation of non-dynamic content, which sets them apart from animated or interactive adverts. These devices' minimalism makes them better suited for contexts that prioritise little distraction or where users are prone to "banner blindness" (Simonetti & Bigné, 2023). The efficacy of these advertisements frequently depends on their visual attractiveness and smart positioning on web pages. According to research, static advertisements are viewed differently than their dynamic equivalents, highlighting how crucial their distinctive features are for drawing in viewers (Muñoz-Leiva et al., 2021; Casado-Aranda et al., 2022; Xie, 2022).

The positioning of static banner ads is essential in determining their effectiveness. Muñoz-Leiva et al. (2021) provided evidence that the placement of a stationary banner ads has a notable impact on its ability to be remembered. Prominently displayed advertisements, especially those in the top or centre of the screen, attract more attention from viewers and are more likely to stick in their minds. Ads near the bottom or sides of the screen, on the other hand, draw less attention and are less likely to be recalled. The cited studies (Muñoz-Leiva et al., 2021; Namin et al., 2020; Nguyen et al., 2020) highlight the significance of strategically placing advertisements to improve memory retention. Static banner ads rely heavily on visual design as a crucial characteristic. Efficient banner ads frequently utilise concepts of visual hierarchy, colour contrast, and minimalistic design to attract attention and communicate messages rapidly. Rudy et al. (2020) stress the need of selecting colour, font, and imagery in a deliberate manner to ensure they are in line with the brand's message and intended audience. Advertisements that have strong visual appeal and are consistent with the content of the page are more likely to be recognised and remembered by viewers (Rudy et al., 2020; Yang et al., 2021; Wang et al., 2020).

The static banner ads also have a substantial psychological influence. Research utilising eye-tracking and neuroimaging methodologies, as demonstrated by Casado-Aranda et al. (2022), has revealed that aesthetically pleasing and emotionally captivating advertisements stimulate brain regions linked to reward and emotion, hence improving memory retrieval. On the other hand, utilitarian advertisements that emphasise information and functioning activate cognitive control areas, suggesting that the quality and type of ad material have a major impact on memory retention (Casado-Aranda et al., 2022; Wang et al., 2020; Yang et al., 2021).

Furthermore, the effectiveness of static banner ads can be assessed using diverse measures, such as click-through rates (CTR), engagement, and conversion rates. In their study, Namin et al. (2020) examined how message design affects user engagement and efficacy of banner ads. They discovered that the kind, size, and format of banner ads substantially impact user involvement and click-through rates (CTR). As seen in Table 9, the metrics mentioned are crucial for assessing the effectiveness of advertising campaigns and improving future ad designs (Namin et al., 2020; Xie, 2022; Lim et al., 2022).

#### 2.2.2 Comparison with Dynamic and Video Ads

Dynamic advertisements, characterised by animated and interactive components, frequently strive to attract user attention by utilising motion and captivating content. Namin et al. (2020) discovered that dynamic banner ads are more effective in engaging users and increasing the efficacy of advertising compared to static ads. This is mainly because dynamic ads can capture and maintain user attention through motion and interactive components (Namin et al., 2020). Additionally, dynamic presentations in mobile food ordering applications have been shown to improve user task performance and subjective evaluations, suggesting that the movement in ads can enhance the user experience (Zhai & Chen, 2023).

Video commercials enhance dynamic advertising by integrating audio-visual components to generate a more engaging and immersive encounter. These advertisements are especially efficient in captivating people and communicating intricate messages. The study conducted by Bellman et al. (2020) suggests that video advertisements outperform static ads regarding both watching times and engagement levels. This is primarily because video commercials offer a more immersive and captivating user experience. In addition, Ausin-Azofra et al. (2021) discovered that 360-degree video advertisements can increase pleasant emotions and engagement. However, if not carefully constructed, certain ad content may not be exposed to the audience (Ausin-Azofra et al., 2021).

The psychological influence of various advertising formats also differs. Dynamic and video advertisements tend to stimulate a greater number of brain regions linked to feelings of reward and emotion, resulting in improved memory retention and increased involvement. Casado-Aranda et al. (2022) employed functional magnetic resonance imaging (fMRI) to demonstrate that dynamic and video advertisements elicit more activation in brain regions associated with reward than static advertisements. This heightened engagement improves memory retention and brand recall (Casado-Aranda et al., 2022). Table 10 presents a comparison of static, dynamic, and video advertisements.

#### 2.2.3 Design Elements of Static Banner Ads

#### 2.2.3.1 Visual Design and Layout

The process of creating visual design in static banner ads entails the deliberate utilisation of colour and contrast, imagery, and text. The selection of colours and the level of contrast in static banner ads substantially impact their visibility and appeal. North and Ficorilli (2017) revealed that blue advertisements outperformed ads of other colours in terms of generating clicks. This suggests that the choice of colour is a significant factor in capturing user attention and involvement.

High contrast between the text and background enhances readability and draws more attention to the ad's content. For instance, Burke et al. (2005) indicated that high contrast ads are less likely to be ignored by users (Burke et al., 2005).

Efficient static banner ads employ unambiguous and pertinent visuals that directly correspond to the message conveyed by the advertisement. This approach guarantees that the visual components are not only visually appealing but also convey useful information (Xie, 2022). The integration of concise and persuasive writing improves the communication of the advertisement's message. Integrating a distinct call-to-action (CTA) can substantially enhance user engagement with the advertisement (Xie, 2022).

The success of static banner ads is significantly influenced by their layout, which encompasses factors such as ad size and position, content arrangement, and visual intricacy. Optimising the dimensions and placement of static banner ads on a webpage is essential for maximising their visibility and user interaction. According to North and Ficorilli (2017), the 300×250 ad size is highly efficient in generating clicks. This implies that the effectiveness of ad sizes may vary depending on their placement. Placing advertisements at the top or centre of the page generally garners more attention than other locations.

The arrangement of visual elements inside the advertisement itself can influence its effectiveness. Zhai and Chen (2023) emphasised that various information arrangements, such as list-style and matrix-style, have an impact on both user task performance and preference. Matrix-style layouts were found to be more effective in terms of user engagement and attractiveness (Zhai & Chen, 2023). Advertisements that have a minimal amount of visual intricacy generally achieve higher levels of user engagement and attractiveness. Bočaj and Ahtik (2023) found that simple ads outperformed complex ones by being noticed quicker and retaining user attention longer. Visually complex ads can overwhelm users, leading to lower engagement and higher chances of banner blindness (Bočaj & Ahtik, 2023). These insights are further supported by the key findings on design elements of static banner ads presented in Table 11.

#### 2.2.3.2 Text and Copywriting

The text displayed in static banner ads plays a crucial part in efficiently and successfully delivering the advertisement's content. Diao and Sundar (2004) suggest that banner ads should use brief and unambiguous text to attract the user's attention and effectively communicate the message before the user leaves the page. Effective text and copywriting can enhance recall and recognition of the ads, making them more memorable (Diao & Sundar, 2004).

The conciseness and clarity of the text are of utmost importance. The writing should be concise and succinct, ensuring that the content is effectively communicated with a minimal number of words. Namin et al. (2020) highlight that excessively wordy advertisements can overpower users and diminish the probability of their involvement. An effective call-to-action (CTA) is crucial for directing user behaviour. Words such as "Click Here," "Learn More," or "Shop Now" have the potential to greatly enhance the click-through rate (CTR) by offering explicit guidance on the user's next action. In a study conducted by Bruce (2017), it was discovered that advertisements featuring specific calls-to-action (CTAs) have higher levels of user engagement.

The ad's exposure and relevancy can be enhanced by incorporating pertinent keywords into the text. Targeting targeted audiences is of paramount importance. According to Xie (2022), people with a specific objective are more inclined to interact with advertisements that incorporate terms that match their search intentions (Xie, 2022). Emotional stimuli within the text can enhance the persuasiveness of advertisements. Using words that elicit curiosity, urgency, or excitement can amplify the effect of the advertisement. Pasqualotti and Baccino (2014) provided evidence that the inclusion of emotionally stimulating terms in banner ads can enhance user attention and involvement (Pasqualotti & Baccino, 2014).

The arrangement and typographical selections are also essential in determining the efficacy of banner ad content. Using larger, more prominent typefaces can effectively capture attention towards the main message or call-to-action. Sans-serif fonts are frequently suggested for enhanced legibility on digital displays. Brown (2002) emphasises that using typefaces that are easy to read might enhance the chances of the content being noticed and read (Brown, 2002). The positioning of the text in the advertisement should be such that it attracts attention without being overly obtrusive. Central positioning frequently proves effective for primary messages and calls-to-action. Namin et al. (2020) propose that the strategic positioning of textual components can have a substantial impact on the efficacy of advertisements (Namin et al., 2020). The observations are consolidated in Table 12, presenting the significant findings about text and copywriting in banner ads.

#### 2.2.3.3 Use of Colors and Images

Colors are fundamental in attracting attention and conveying messages in banner ads. Xie's (2022) research indicates that the selection of colour has a substantial impact on the visibility and appeal of advertisements. An example of this is when advertisements utilise contrasting colours between the text and background, which increases the likelihood of attracting the viewer's attention and improving readability (Xie, 2022).

Research has demonstrated that particular colours have the ability to elicit distinct emotions and reactions in observers. North and Ficorilli (2017) discovered that blue banner advertisements tend to elicit clicks more than adverts of other colours. This is likely because the colour blue is commonly associated with trustworthiness and reliability (North & Ficorilli, 2017). On the other hand, too vibrant or contrasting colours might result in visual exhaustion and contribute to banner blindness, a phenomenon in which consumers unconsciously disregard the advertisements.

Strategically employing pictures can direct the viewer's focus towards particular sections of the advertisement. According to a study by Bočaj and Ahtik (2023), consumers tend to focus longer on advertisements that have seamlessly incorporated visuals and pertinent to the message. This not only improves immediate recognition but also boosts long-term recall.

The combination of colors and images in banner ads can create a powerful impact on user engagement and ad effectiveness. Huhmann's (2003) study highlighted the need to effectively combine various aspects, such as utilising colour schemes that enhance images, to maximise visual attractiveness and cognitive processing. The combination of colour and image can decrease cognitive burden and enhance the ad's memorability (Huhmann, 2003). Table 13 provides a concise summary of the main discoveries about using colours and graphics in banner ads.

#### 2.2.4 Effectiveness of Static Banner Ads

#### 2.2.4.1 Metrics for Measuring Ad Effectiveness

Click-Through Rate (CTR) is the primary metric used to measure the effectiveness of static banner ads. CTR, is determined by dividing the total number of ad clicks by the number of times the ad is shown (impressions), and then multiplying the result by 100 to obtain a percentage. A higher CTR signifies that the advertisement is successful in encouraging viewers to click on it and visit the advertiser's website. Chaffey and Ellis-Chadwick (2020) state that the average CTR for banner ads typically falls between 0.1% and 0.35%. However, it is important to note that this range might fluctuate depending on the industry and where the ads are placed. Table 14 displays the mean click-through rates categorised by industry.

The conversion rate is a metric that quantifies the proportion of people that successfully complete a desired activity, such as making a purchase, subscribing to a newsletter, or downloading a resource, after clicking on an advertisement. This indicator is essential for evaluating the ad's efficacy in generating significant engagement beyond mere clicks. According to Yang and Ghose (2020), the conversion rates can differ considerably depending on the ad's relevance and the quality of the landing page.

Impressions represent the overall count of times an ad is shown. When there are high impressions but limited reach, it suggests that the ad is being seen by the same users several times. This can be good for remembering the brand, but it can also cause ad fatigue (Goldfarb & Tucker, 2019).

Cost Per Click (CPC) refers to the payment an advertiser makes for each individual click on their advertisement, while cost per mille (CPM) is the expense incurred for every one thousand impressions of the ad. These metrics are crucial for assessing the cost-effectiveness of an advertising campaign. Decreased CPC and CPM numbers indicate a more effective use of the advertising budget (Chen, Pavlov, & Canny, 2019).

Viewability assesses whether an advertisement was genuinely observed by users rather than simply delivered. According to the IAB (2019), an advertisement is deemed viewable when at least 50% of its pixels are visible on the screen for a minimum of one second. Engagement rate extends beyond clicks and encompasses activities with the ad, such as mouse hovers or interactions with interactive components. High engagement rates suggest that the advertisement is successfully attracting and holding the attention of viewers.

Surveys and brand lift studies measure ad recall and brand awareness. These measures evaluate the effectiveness of users' recall of the advertisement and the brand following exposure. Batra and Keller (2019) show that ads that include appealing visuals and clear messaging are more likely to obtain higher recall rates. Brand lift studies quantify the growth in brand recognition and evaluation that occurs as a result of an advertising campaign.

The bounce rate is a metric that quantifies the proportion of users that click on the advertisement but then promptly exit the landing page without engaging in any additional interactions. A high bounce rate may suggest that the advertisement is deceptive or that the landing page fails to match user expectations. To decrease bounce rate, it is important to ensure that the advertisement and landing page are congruent in terms of messaging and user experience (Batra & Keller, 2019).

#### 2.2.4.2 Impact on Brand Awareness

Brand recall and recognition are essential metrics for measuring brand awareness. Static banner ads serve a crucial function in facilitating users' recall of the advertised brand. Namin et al. (2020) found that the effectiveness of banner ads in brand memory is greatly influenced by their design and location. According to Namin, Hamilton, and Rohm's research, banner ads that are strategically positioned and have captivating designs are more likely to be remembered by viewers (2020).

Eye-tracking research has shown that advertisements positioned at the top of a webpage are more likely to capture attention and result in better memory rates than those placed at the bottom (Muñoz-Leiva, Liébana-Cabanillas, & Hernández-Méndez, 2018).

The frequency of advertising exposure is a crucial aspect that directly affects brand awareness. In their study, Lee et al. (2015) investigated the impact of repeated exposure to banner ads and discovered that it improves the ability to remember information and recall a brand. However, it was also shown that excessively frequent exposures could result in ad wear-out, wherein people begin to disregard the commercials (Lee, Ahn, & Park, 2015).

The appealing nature of banner ads, whether they evoke an emotional or logical response, also impacts the level of recognition and familiarity with the brand. In their study, Hussain et al. (2018) investigated how different types of advertisements and appeals influence consumer perceptions of the brand. The study conducted by Hussain, Ferdous, and Mort (2018) revealed that advertising with emotional appeal was more successful in generating a favourable attitude towards the brand, hence increasing brand awareness.

User engagement with banner ads, such as clicking on them and interacting with the content, serves as a reliable measure of brand awareness. Obal and Lv (2017) found that interactive banner ads, which combine persuasive calls-to-action and appealing images to stimulate user participation, are more successful at improving brand recall and recognition compared to non-interactive commercials (Obal & Lv, 2017). Table 15 provides a concise summary of the primary measures used to measure the efficacy of banner ads in terms of brand awareness.

#### 2.2.4.3 Impact on Consumer Behavior and Engagement

Static banner ads often serve as the first point of contact between a brand and potential customers. Their visual appeal and messaging can substantially influence user behaviour. Drèze and Hussherr (2003) found that even static ads with limited interactivity possibilities can successfully attract attention and stimulate interest. The minimalistic design of static banners might be beneficial, as they do not inundate consumers with excessive animation or interaction, which can occasionally result in ad fatigue or avoidance.

The positioning and frequency of static banner adverts are crucial determinants of their efficacy. Increased brand presence on popular websites can result in greater brand recognition and trust. According to a study conducted by Chaffey and Ellis-Chadwick (2019), regular exposure to static banner ads improves the ability to remember a brand, which then affects customer behaviour by increasing brand recognition and trustworthiness. The level of familiarity can enhance the

probability of users actively interacting with the brand, either by directly engaging with the advertisement or by subsequently visiting the business's website.

According to Yang and Ghose (2010), static banner ads are simple and inconspicuous, which can attract viewers who want a less intrusive online experience. This can result in consistent, albeit not exceptional, engagement rates. Furthermore, the combined impact of repeated exposure might result in heightened brand involvement as time progresses.

The appropriateness and quality of the landing page are critical factors in turning clicks from static banner ads into meaningful actions. A study by Batra and Keller (2019) suggests that a landing page carefully built to match the message of the ad can greatly improve conversion rates. This alignment guarantees a smooth user experience, strengthens the message of the advertisement, and promotes additional interaction, such as subscribing to newsletters, making purchases, or seeking more information.

Another crucial element of static banner ads is their capacity to impact unconscious customer behaviour. Zajonc (2001) proposed the concept of the simple exposure effect, which states that repeated exposure to a stimuli, like as a brand logo or advertisement, enhances the probability of individuals acquiring a preference for it. Static banner advertising use this psychological effect by continually displaying brand features, which can gently impact consumer preferences and behaviours even if viewers do not initially interact with the ad.

Brand lift studies, which analyse changes in brand perception and purchase intent before and after an advertising campaign, can evaluate the performance of static banner ads. Li, Sun, and Montaner (2018) 's research revealed that static banner ads have the potential to enhance brand perception and boost the probability of future sales. These advertisements enhance a positive perception of the brand by regularly conveying concise and targeted themes that strongly resonate with the intended demographic.

Goldfarb and Tucker (2011) conducted a research on the relationship between advertising format and customer behaviour. The researchers discovered that interactive advertisements may generate rapid clicks, but static advertisements lead to a gradual development of brand engagement and loyalty. This discovery emphasises the importance of static advertisements in establishing a brand's long-term presence rather than generating short-lived bursts of engagement. Table 16 presents a concise overview of the primary indicators used to gauge the impact of banner advertisements on consumer behaviour and engagement.

#### 2.3. Social Media as An Advertising Platform

#### 2.3.1 Overview of Social Media Platforms

Facebook, with over 3 billion monthly active users as of April 2024, remains a dominant platform in social media advertising (Statista, 2024). Its robust advertising ecosystem allows for highly targeted campaigns using user data, demographics, and interests. Facebook Ads Manager offers comprehensive analytics that allow marketers to monitor engagement, conversion rates, and return on investment (ROI) with precision. A study by Dehghani, Niaki, Ramezani, and Sali (2016) highlighted the efficacy of Facebook in enhancing brand loyalty by utilising personalised and interactive content. In addition, a study conducted by Chen, H., Chiang, R. H., and Storey, V. C. (2012) showed that the platform's focused advertising greatly enhances user involvement and conversion rates. A study conducted by Araujo, Neijens, and Vliegenthart (2015) examined the influence of engagement with Facebook ads on brand loyalty, highlighting the significance of interactive and personalised content in social media advertising.

Instagram, owned by Facebook, boasts over 2 billion active users and is particularly popular among younger demographics. Instagram's visually-focused platform is well-suited for firms seeking to utilise top-notch photographs and videos. The incorporation of services such as Instagram Stories, IGTV, and shoppable posts has bolstered its advertising prospects. Jin and Ryu (2018) found that Instagram advertising had a substantial influence on user engagement and purchase intentions since the platform prioritises visual storytelling. A separate research conducted by Lou, Xie, and Feng (2019) discovered that endorsements from influencers on Instagram have a positive impact on brand perceptions and intentions to make a purchase, especially among younger users. Furthermore, a study conducted by Sheldon and Bryant (2016) revealed that Instagram's interactive functionalities, such as the ability to like and comment on posts, promote increased user involvement and brand contact.

X/ Twitter, with 611 million monthly active users, is known for its real-time information dissemination and conversational nature (Statista, 2024). Twitter Ads facilitate direct user involvement by allowing marketers to promote tweets, accounts, and trends. By providing relevant and timely content, Twitter is a powerful tool for building consumer relationships and brand recognition, according to a study by Fischer and Reuber (2014). The hashtag feature of the platform enables users and companies to participate in trending topics, boosting their exposure and engagement. Furthermore, a study by Rauschnabel, Rossmann, and Tom Dieck (2017) highlighted how effective Twitter is in encouraging consumer interaction by providing dynamic

and current information. In addition, a study by Liu, Burns, and Hou (2017) showed that Twitter's ability to provide real-time communication greatly improves interactions and engagement between brands and customers.

LinkedIn, a professional networking site with 770 million members, is particularly effective for B2B marketing. LinkedIn has a range of advertising options, such as Sponsored Content, InMail, and Display Ads, that enable professionals to be targeted according to their industry, job title, and company size. According to a 2015 study by Dwivedi, Kapoor, and Chen, LinkedIn's customised advertising improves the effectiveness and efficiency of B2B marketing campaigns. Furthermore, a study conducted by Swani, Brown, and Milne (2014) demonstrated that incorporating emotional content into LinkedIn posts had a substantial impact on user engagement and the exposure of a company.

TikTok, with over 1.5 billion active users as of April 2024, has emerged as a significant player in the social media landscape, particularly among Gen Z (Statista, 2024). TikTok's unique algorithm makes it easier to promote viral content, giving marketers the chance to reach a large organic audience. The platform provides a variety of ad formats, including Branded Effects, Branded Hashtag Challenges, and In-Feed Ads. These formats seek to encourage active engagement and user-generated content. According to a study by Omar and Dequan (2020), TikTok advertisements are exceptionally successful in attracting user attention and promoting interaction as a result of their innovative and enjoyable characteristics. Furthermore, a study by Wongkitrungrueng and Assarut (2020) discovered that the interactive elements and concise video content on TikTok greatly improve user involvement and the ability to remember brands. In addition, Li, Larimo, and Leonidou (2020) emphasised the platform's effectiveness in targeting younger age groups and generating viral marketing campaigns. This information is summarised in Table 17, which presents a comprehensive overview of prominent social media platforms for advertising purposes.

#### 2.3.2 Ad Placement and Targeting on Social Media

Ad placement on social media platforms is a critical factor in the success of advertising campaigns. Ads within user's feeds, stories, posts, articles, and promoted tweets are just a few of the advertising placement options offered by social media platforms including Meta, LinkedIn, Twitter, TikTok, and Snapchat. The purpose behind these placements is to increase the likelihood of user interaction by seamlessly integrating into the user's experience. Sharma and Ashfaq (2023) found that incorporating advertisements directly into the user's social media feed greatly improves

user engagement and brand memory. Moreover, the impact of these ad placements is different upon their positioning within the same platform, as advertising placed in stories and feeds frequently yield better results compared to those in less prominent locations (Sharma & Ashfaq, 2023). A separate study conducted by Gemenis (2023) identified that using Facebook's tailored ad placements (Advantage +) may rapidly produce samples that are diverse in terms of demographics, all while keeping costs low.

Social media targeting utilises algorithms to pinpoint and engage with the relevant audience segments, taking into account factors such as demographics, interests, behaviours, and geographic regions. This strategy guarantees that ads are shown to people who are highly relevant or have an interest in the promoted product or service. De Maio et al. (2020) emphasised the significance of context-aware ad targeting, which utilises time, location, and user interests to develop a precise targeting approach. This approach utilises the examination of publicly available content to deduce user preferences and align them with appropriate advertisements, hence enhancing the efficiency of ads (De Maio et al., 2020).

The effectiveness of targeting tactics is further exemplified in political advertising. In their study, Tanusondjaja et al. (2023) examined a total of 11,837 advertisements on Snapchat that were displayed during the 2020 U.S. presidential election. The researchers discovered that utilising fewer targeting criteria and longer advertising schedules resulted in higher impressions, while maintaining comparable or lower costs compared to more intricate microtargeting tactics. The discovery emphasises the possibility of enhancing advertising expenditure by employing strategic targeting (Tanusondjaja et al., 2023).

In addition, Yoon, Huang, and Yim (2022) investigated the significance of ad-content relevancy in native advertising on social media. Their study found that those who initially had less positive sentiments towards social networking sites showed a notably greater level of involvement with advertisements that were closely related to the media content. These findings indicate that the relevancy of advertisements is a critical factor in improving user engagement and the effectiveness of ads (Yoon, Huang, & Yim, 2022).

#### 2.3.3 Challenges and Opportunities in Social Media Advertising

One of the primary challenges in social media advertising is the management of negative electronic word-of-mouth (eWOM). Adverse eWOM can have a substantial effect on the reputation of a brand and the trust that consumers have in it. A study conducted by Dwivedi et al. (2020) emphasised that social media advertising has a substantial risk in the form of unfavourable
eWOM. Rapid dissemination can occur through several networks, thereby impacting the reputation of a brand and influencing consumer perspectives. Moreover, the intrusive nature of online advertisements might result in consumer annoyance, hence reducing the efficacy of advertising efforts (Dwivedi et al., 2020). Sharma and Ashfaq (2023) discovered that social media offers significant possibilities for customised and focused advertising. However, the difficulty lies in maintaining a balance between relevance and intrusiveness to prevent negative reactions from consumers.

On the other hand, social media platforms provide significant prospects for businesses to interact with a wide-ranging audience and cultivate brand loyalty. Korcsmáros and Csinger (2022) highlighted that social media enables organisations to effectively target specific audiences, promptly obtain feedback, and engage in instantaneous contact. These capabilities can strengthen consumer loyalty and boost sales (Korcsmáros & Csinger, 2022). In addition, social media platforms facilitate the production of content provided by users and collaborations with influencers, which can greatly enhance brand recognition and trustworthiness. Tungande et al. (2020) discovered that social media enables brands to communicate with their customers more quickly and collaboratively. This is important for preserving customer relationships and gaining a competitive edge (Tungande et al., 2020).

Assessing the effectiveness of social media advertising continues to be a significant obstacle. Measuring return on investment (ROI) accurately is challenging since social media interactions are multidimensional and have an indirect influence on customer behaviour. Poorani et al. (2021) emphasised the challenge of measuring the effect of social media campaigns, pointing out that conventional metrics may not comprehensively represent the extent of consumer involvement and the lasting advantages of social media advertising (Poorani et al., 2021). In addition, Lawa (2020) highlighted that the swift development of social media platforms and the frequent modifications in algorithms present considerable obstacles for advertisers attempting to stay updated with optimal strategies and accurately assess the effectiveness of their campaigns (Lawa, 2020).

Nevertheless, the potential benefits offered by social media advertising are significant. Utilising data-driven insights to customise advertisements for specific target audiences can result in increased engagement rates and more impactful marketing efforts. Bauman and Lucy (2020) examined the role of social media in generating value for customers by offering tailored information and interactive experiences. This, in turn, can strengthen brand loyalty and stimulate business expansion (Bauman & Lucy, 2020). Marušić and Vranešević (2021) highlighted that

smart and targeted advertising on social media may provide in-depth analytics and cost less than traditional media, making it a cost-effective marketing strategy (Marušić & Vranešević, 2021).

# 2.4. Intersection Of Ad Frequency And Memory Retention In Social Media Context

# 2.4.1 Studies on Ad Frequency in Social Media

A study by Lewis and Reiley (2014) investigated the impact of frequency capping on Facebook advertising campaigns. According to their study, limiting the number of times an ad is shown to a user to three or four per week greatly enhanced user engagement and reduced ad fatigue. By restricting the number of times ads are shown, advertisers may sustain user engagement without inundating them, therefore improving the overall success of the campaign. Brasel and Gips (2014) found evidence that when adverts are shown too frequently without a limit, it can lead to saturation, reduced effectiveness, and negative reactions from users. Furthermore, Sahni's (2016) research supports the idea that excessive exposure to advertisements can result in people actively avoiding them. To ensure optimal levels of engagement, it is crucial to implement frequency limiting as a necessary tool. The findings emphasised that implementing frequency capping not only mitigates ad fatigue but also enhances the perceived relevancy of advertisements. Sahni's research revealed that advertisements displayed within the ideal frequency limit were more prone to being recalled and responded to by users. In addition, Tucker's (2014) research highlights that implementing frequency capping can achieve a harmonious balance between ad exposure and user experience, resulting in increased click-through rates and total ad effectiveness. Todri and Adamopoulos (2021) discovered that judicious frequency capping is crucial in dynamic advertising environments to sustain user engagement and prevent ad wear-out.

Lambrecht and Tucker (2013) conducted further analysis to investigate the relationship between frequency capping and ad personalisation. Their research unveiled that the utilisation of frequency capping yielded notable results, especially when integrated with personalised advertisements. Personalised ads shown within the frequency limit exhibited superior clickthrough rates and conversion rates in comparison to non-personalized advertisements. Frequency capping can optimise the effectiveness of personalised advertising by ensuring that adverts are seen a sufficient number of times to be impactful, while avoiding excessive repetition. De Haan, Wiesel, and Pauwels (2016) provided evidence that personalised ad campaigns with frequency capping effectively enhance consumer engagement and decrease the chances of ad weariness. Zhang and Wedel's (2009) study provides additional support for these findings, demonstrating that implementing personalised ad frequency capping enhances both ad performance and user satisfaction.

Todri and Adamopoulos (2021) conducted a thorough examination that assessed the wider consequences of frequency capping on both the effectiveness of advertisements and the experience of users. According to the assessment, frequency restriction might significantly reduce the incidence of ad fatigue, a major problem in social media advertising. Todri and Adamopoulos found that the optimal frequency limitations varied by ad design and platform, but generally fell between three and five exposures per user each week. Their study highlighted the importance of regularly monitoring and adjusting frequency caps, taking into account user input and engagement metrics, in order to sustain the efficacy of advertisements over a period of time. Dynamic frequency capping, which is adjusted in real-time based on user interaction, has been shown to improve ad performance and result in sustained engagement (Li and Lo, 2015). Furthermore, Bruce, Peters, and Naik (2012) emphasise how important it is to modify frequency limitations to reflect the evolving tastes and habits of social media users. This information is summarised in Table 18, which provides an overview of significant studies on frequency capping in social media advertising.

# 2.4.2 Memory Retention of Ads on Social Media

A study by Bolls, Muehling, and Yoon (2018) examined the impact of emotional content on ad recall in social media. They discovered that advertisements that evoked intense emotional reactions were more likely to be remembered by users in comparison to neutral advertisements. The results of Bakker and Rickard's (2018) study align with this, as they showed that emotionally stimulating material greatly improves the ability to remember information. Furthermore, a study conducted by Dehghani, Niaki, Ramezani, and Sali (2016) emphasises that interactive advertisements, which enable user participation or feedback, enhance memory rates by fostering greater levels of engagement.

Stocchi, Driesener, and Nenycz-Thiel (2015) conducted additional investigation to determine the most effective frequency of advertisements for enhancing memory recall. Researchers found that a moderate advertising frequency of three to four exposures per week was the most efficient in improving ad memory without causing ad fatigue. This finding aligns with the research by Campbell and Marks (2015), who observed that excessive ad exposure could negatively impact memory retention by causing irritation and ad avoidance behaviors among users. Tucker (2014) discovered that using frequency capping is beneficial for achieving a balance

between adequate exposure and avoiding user irritation. This ultimately improves the retention of information in memory.

The research by Jin and Ryu (2018) highlights the significance of visual content in enhancing memory recall in Instagram advertisements. According to their research, the use of high-quality photos and videos greatly enhances the ability to remember advertisements, especially among younger age groups that have a stronger preference for visual content. This claim is supported by by Lou, Xie, and Feng (2019), indicating that commercials with visually captivating qualities have a higher probability of being retained in memory and prompting action. Moreover, Sheldon and Bryant (2016) suggested that the presence of interactive elements, such as likes and comments on Instagram, enhances engagement and, as a result, improves the ability to remember advertisements.

Bleier and Eisenbeiss (2015) conducted a study to investigate the impact of personalisation on memory retention. They found that personalised advertisements, which are customised to match individual user interests and behaviours, have a significant positive effect on memory retention. According to their research, personalisation enhances the pertinence of the advertising content, resulting in improved memorability. This is corroborated by the research of Lee, Hosanagar, and Nair (2018), who found that targeted ads on Facebook, using data-driven insights to personalize content, resulted in higher recall rates compared to non-targeted ads. Moreover, Lambrecht and Tucker (2013) demonstrated that personalised retargeting advertisements, which serve as reminders of previously viewed products, have a notable impact on enhancing memory retention and increasing conversions. This information is summarised in Table 19, which outlines the primary factors that influence the memory retention of advertisements on social media.

## 2.5. Gaps in the Existing Literature

Despite significant advancements in understanding the impact of ad frequency on memory retention of static banner ads on social media, several gaps remain in the existing research. A significant gap exists in the examination of the most effective frequency for distinct categories of static banner ads on diverse social media platforms. The majority of research, such as those conducted by Brasel and Gips (2014), and Campbell and Marks (2015), have mostly concentrated on overall advertisement frequency without distinguishing between static and dynamic advertisement forms. This assertion fails to consider the distinct attributes and user engagements linked to static banner advertisements, which could potentially distort the results (Wiese & Döring, 2021).

Another significant gap lies in the insufficient incorporation of demographic and psychographic factors when optimising ad frequency. The study conducted by Bleier and Eisenbeiss (2015) emphasises the efficacy of personalised advertisements. However, there is a dearth of research investigating the response of distinct audience segments to different frequencies of static banner ads. According to Jin and Ryu's (2018) study on Instagram ads, younger users may have different rates of remembering and degrees of tolerance for how often they see ads compared to older users. Gaining insight into these subtleties has the potential to result in more customised and efficient advertising tactics (Dehghani, Niaki, Ramezani, & Sali, 2016).

In addition, there is a lack of longitudinal research that evaluate the lasting effects of advertising frequency on memory retention and brand recall. The majority of previous studies, exemplified by Stocchi, Driesener, and Nenycz-Thiel (2015), primarily examine the immediate ability to remember information, neglecting to investigate the impact of repeated exposure over prolonged durations on consumer behaviour and memory retention. Longitudinal research are crucial for comprehending the durability of advertising impacts and for formulating tactics that uphold customer involvement over an extended period (Li & Lo, 2015).

Further work is necessary to examine the impact of ad content quality in combination with ad frequency. The studies conducted by Dehghani et al. (2016) and Li and Lo (2015) highlight the significance of superior visual content in improving memory recall. However, there is a lack of research that investigates the specific impact of the interaction between ad quality and frequency on memory retention, particularly for static banner advertising. This gap suggests a need for more extensive research that combines content quality measures with frequency optimisation to offer a comprehensive knowledge of successful advertising tactics (Bleier & Eisenbeiss, 2015).

Moreover, the impact of ad fatigue on memory retention for static banner ads remains underexplored. Existing research, exemplified by the work of Wiese and Döring (2021), recognises the negative effects of ad weariness. However, these studies do not extensively investigate the specific role of various ad frequencies in contributing to this issue, particularly in the context of static ads. Conducting thorough study on the specific points at which ad fatigue occurs for static banners could assist marketers in more accurately adjusting their frequency capping methods to prevent diminishing returns (Tucker, 2014).

A major gap is in the insufficient understanding of the cognitive processes implicated in the retention of static banner advertisements. Although there has been significant research on dynamic and video ads, Casado-Aranda et al. (2022) have pointed out a lack of studies that particularly investigate the cognitive mechanisms that impact the memory of static banner ads. It is crucial to study the cognitive impact of static ads in digital marketing, as they are still commonly utilised. This understanding can help improve ad designs and placements for better effectiveness (Casado-Aranda et al., 2022).

There is another notable gap in the way ad frequency and user engagement interact on various social media platforms. The study conducted by Muñoz-Leiva et al. (2021) has demonstrated that the placement of banners has an impact on both visual attention and recollection. However, there is currently a lack of data about the interaction between these parameters and the frequency of ad exposure. The engagement between users and advertisements is crucial in formulating methods that effectively manage the frequency of ads, ensuring optimal recall without inducing ad fatigue or user annoyance (Muñoz-Leiva et al., 2021; Todri et al., 2020).

In addition, there is a lack of study regarding the influence of social interactions and usergenerated material on the ability to remember static banner ads. Sanak-Kosmowska (2020) examined the impact of user suggestions and comments on ad recall. The study highlights the necessity for more empirical research that incorporates social proof and engagement metrics when analysing static banner advertising. This research has the potential to offer valuable insights into the impact of social dynamics on the effectiveness and recall of advertisements (Sanak-Kosmowska, 2020; Zimmerman & Brown-Schmidt, 2020).

Lastly, the effects of ad frequency capping on the long-term recall of static banner ads are not well-documented. Previous research conducted by Romberg et al. (2020) and Lim et al. (2022) has examined frequency capping in relation to various ad formats, but there is a lack of particular techniques for static advertisements. It is crucial for efficient ad campaign management to comprehend the ideal frequency cap that maximises recall while minimising ad fatigue (Romberg et al., 2020; Lim et al., 2022). Table 20 presents the primary gaps in research about the relationship between ad frequency and memory retention of static banner ads.

### 2.6. Summary

Ad Placement and Recall: A significant discovery is the impact of ad placement and user experience on the ability to remember information. Advertisements positioned in prominent locations, such as the upper or middle section of the screen, elicit more visual focus and have a higher likelihood of being retained in memory. In contrast, advertisements placed at the bottom or edges of the screen attract less attention and are remembered less frequently. The aforementioned studies by Muñoz-Leiva et al. (2021), Namin et al. (2020), and Nguyen et al. (2020) highlight the significance of strategically placing advertisements to improve memory retention.

Content Quality Impact: The importance of ad content quality is also crucial. Research utilising functional magnetic resonance imaging (fMRI) has discovered that hedonic advertisements, which are visually captivating and emotionally stimulating, activate brain regions linked to reward and emotion, hence improving memory retrieval. In contrast, utilitarian advertisements, which are informational and functional, activate cognitive control areas of the brain. This suggests that the quality and type of ad material have a major impact on memory retention, as shown in studies by Casado-Aranda et al. (2022), Wang et al. (2020), and Yang et al. (2021). In addition, content that is of superior quality and visually captivating can maintain higher frequencies without causing ad fatigue, as demonstrated by studies conducted by Jin and Ryu (2018) and Dehghani et al. (2016).

The frequency at which ads are shown to users is a critical factor in determining both user irritation and the effectiveness of the ads. Repeated exposure to advertisements can enhance recollection and guide consumers towards making a purchase. However, excessive repetition might result in ad fatigue and aggravation (Todri et al., 2020; Lim et al., 2022; Xie, 2022). Studies indicate that a frequency of three to four exposures per week is the most efficient for static banner advertising on platforms such as Facebook. The selected frequency of these adverts is designed to capture consumers' attention and leave a lasting impression, while avoiding any sense of being inundated or overwhelmed (Campbell & Marks, 2015; Brasel & Gips, 2014; Li & Lo, 2015).

Personalisation: The frequency of adverts is an important factor in the personalisation process. Customised advertisements that are specifically designed to match the interests and behaviours of individual users greatly improve their level of involvement and ability to remember the content (Bleier & Eisenbeiss, 2015; Jilcha & Kwak, 2022; Wooley et al., 2022). Implementing personalisation tactics enables advertisers to increase the frequency of ad exposures without encountering the negative consequences of ad fatigue. This is because people see these personalised advertising as more relevant and captivating, as supported by studies conducted by Lee, Hosanagar, and Nair (2018) and Lambrecht and Tucker (2013).

User Interaction: The effectiveness of static banner ads can be improved by taking into account the interplay between the frequency of ad display and user-generated content. Testimonials and feedback from acquaintances and opinion leaders on social media have a substantial influence on the recollection and assessment of advertisements. Integrating user engagement measurements with frequency techniques has the potential to enhance recall rates, as indicated by studies conducted by Sanak-Kosmowska (2020), Motoki et al. (2020), and Wang et al. (2020).

The design and inventiveness of banner ads play a crucial role in their effectiveness. Advertisements that are creative, particularly those that are visually attention-grabbing and match well with the content of the page, are more likely to overcome the phenomenon of banner blindness and obtain greater rates of recognition. These studies suggest that a combination of creative ad design and the right frequency can greatly improve ad recall (Yang et al., 2021; Nguyen et al., 2020; Hong et al., 2021).

Ad Fatigue: Ad fatigue continues to be a major obstacle in optimising the frequency of advertisements. Elevated advertisement frequencies can result in heightened user irritation and diminished user involvement. This tendency is especially evident in static banner ads, where repeated exposures can rapidly become bothersome. Frequency capping refers to the practice of restricting the number of times an advertisement is displayed to a particular user. It is a successful approach to combat ad fatigue and ensure strong memory rates (Wiese & Döring, 2021; Tucker, 2014; Stocchi, Driesener, & Nenycz-Thiel, 2015).

Longitudinal studies highlight the importance of comprehending the lasting impacts of advertising frequency on memory retention. Although modest ad frequency may improve short-term memory rates, achieving long-term brand loyalty and influencing customer behaviour necessitates the implementation of continuous engagement techniques. Further investigation should prioritise the examination of the impact of repeated exposures over prolonged durations on consumer memory and brand perception. This research is supported by Stocchi, Driesener, and Nenycz-Thiel (2015), Li and Lo (2015), and Dehghani et al. (2016). Table 21 provides essential insights on the relationship between advertisement frequency, memory retention, and static banner ads.

### **METHODOLOGY**

This chapter explains the research approach that was used in the study on factors affecting the effectiveness of social media advertisements.



Figure 1. Conceptual Framework

This conceptual framework illustrates the relationship between key advertising variables and memory retention of static ads. User engagement level serves as a mediating factor influenced by user characteristics, platform dynamics, and advertising variables. Key inputs such as ad frequency, content, personalization, placement, and format directly impact user engagement. Personalization enhances relevance, while strategic ad placement and appropriate formats improve visibility and recall. Ad frequency determines cognitive processing, balancing exposure and engagement. These elements collectively affect memory retention of static ads, highlighting the need for well-coordinated strategies to optimize user interaction and recall outcomes in digital advertising campaigns. As a methodological approach, the work relies on Saunders' Research Onion (Saunders, et al., 2019); employs only qualitative research techniques; involves only one type of data collection tool, namely, semi-structured interview; and adopts thematic analysis only as a way to analyze the data. The rationale is to make the formulation of methodology keep a logical structure to follow in tackling the research objectives objectively.

### **3.1 Research Philosophy**

The choice of the philosophical stance is an interpretive position, focusing on the participant's experience and perceptions. Interpretivism is appropriate to employ with Facebook Ads experts to determine the effectiveness of the ads in their contextual perception (Saunders et al., 2019). This approach enables researchers to delve into the social and cognitive antecedents of ad recall and attention in detail.

### **3.2 Research Approach**

The study adopts an inductive method of analysis, which means developing ideas and hypotheses from the data collected during interviews. Inductive reasoning helps in the creation of theories that are formed out of patterns and trends that emerge out of the data (Creswell, 2013). This approach is most appropriate in exploring areas that are not well studied, such as examining how positions of adverts, their quality, and different measures of engagement affect the behavior of users.

# **3.3 Research Design**

This work adopts a mono-method qualitative research methodology and conducts only interviews as the source of data. This choice relates to the purpose of obtaining comprehensive and specialized information about the antecedents of social media ad effectiveness (Kvale & Brinkmann, 2009). The study employs the cross-sectional time horizon whereby interviews are conducted at a given time so that professionals in the industry provide contemporary information. As a result, a cross-sectional study is suitable for determining the current understanding of performance marketing and the trend in this area of study (Saunders et al., 2019).

The research questions for this study were derived directly from the research objectives, ensuring alignment with the investigation's overarching goals. These questions were created to offer a methodical way to investigate the elements affecting static banner advertising's efficacy on social media sites. This method involves looking at important aspects such as ad frequency, user demographics, personalization, and content quality to address both short-term and long-term effects on memory retention, recall, and user engagement.

The research questions were formulated by a thorough review of existing literature and current industry practices. Insights from this review underscored the significance of ad frequency and content relevance in shaping user responses to social media advertising. Furthermore, the questions were refined to focus on exploring nuanced elements such as ad fatigue, tolerance levels, and the role of content personalization in enhancing user experiences.

This approach ensures coherence and focus in the data collection process by grounding the research questions in the study objectives. The questions were designed to efficiently direct the interviews so that in-depth, situation-specific observations from professionals in the field could be recorded. This agreement upholds the qualitative technique used for this study and supports its goal of significantly contributing to the field of performance marketing.

# 3.4 Data Collection

### 3.4.1 Sampling and Participants

This study interviewed fifteen industry experts in Facebook Ads from leading performance marketing firms globally. In this study, participants were recruited through purposive sampling, and they had considerable experience in digital advertising. This methodology provided the means of obtaining relevant, vivid, and various insights into ad effectiveness (Creswell & Plano Clark, 2011).

#### **3.4.2 Interview Design**

Semi-structured interviews were deemed most suitable as they let both guiding themes to be addressed, and unexpected patterns to be addressed as well. In total, we used the interview guide to address variables including ad frequency, placement, complexity, as well as engagement numbers. Through the use of open-ended questions, the participants expressed their understanding of the events and/or ideas in detail (Kvale and Brinkmann, 2009).

# 3.4.3 Ethical Considerations

Each participant's information was obtained willingly, and we made certain that the participants understood their rights to privacy and to withdraw from the study at any time. To

ensure the participants had informed consent, they were given operational details of the study and its use of data. The research followed the guidelines set by the British Psychological Society (BPS, 2018).

# 3.5 Data Analysis

# 3.5.1 Thematic Analysis

The collected data was analyzed in line with thematic analysis, common in use in qualitative research, whose foremost purpose is to discover themes when analyzing large data sets (Braun & Clarke, 2006). The thematic analysis involved six steps: familiarization with the data, identification of codes, rating of themes, definition of themes, and production of the final report.

# 3.5.2 Coding Process

Data coding was conducted manually to ensure an in-depth understanding of the content. Codes were derived inductively from the data, reflecting the participants' perspectives and experiences. Key themes emerged around ad quality, user engagement, and the competitive landscape.

# 3.5.3 Data Validation

To maintain reliability, the process of member checking was also applied, whereby participants were given a chance to review and confirm the responses provided to them. Triangulation was also used in two ways, including submitting the findings with previous literature on social media advertising (Dwivedi et al., 2021; Alalwan et al., 2017).

#### 3.6 Limitations of the Methodology

However, the constructed approach has disadvantages of the following nature due to the heaviness of the methodology. The possibility of generalizing the conclusions used in this project may be hampered by the focus on a single qualitative method. In addition, a purposive sample, although useful for achieving the aspect of expertise, raises an issue regarding the bias when identifying participants (Saunders et al., 2019). The following literature could incorporate mixed methods to overcome these limitations of the study. Possible future research studies could employ a mixed-method design to overcome these limitations of the current study.

# 3.7 Summary

The applied approach proves adequate for collecting information about experts' perceptions of factors that determine the efficacy of social media advertising. In order to address these questions, the study adopts the Research Onion framework developed by Saunders et al. The analysis uses interpretivist philosophy in the selection of the methodology, inductive reasoning, and thematic analysis to marshal clear, layered, and systematic thinking. Based on this rigorous approach, the important findings help establish the relationship between the different variables in the context of social media advertising.

# **RESULTS AND ANALYSIS**

### **4.1 Introduction**

This chapter recapitulates the research and analysis of the study with a specific focus on a number of factors that determine the extent of ad recall and engagement. The chapter begins by methodically studying the impact of factors such as ad frequency, placement, quality, and the users themselves. The research objectives, which are fundamentally on identifying factors that increase the likelihood of an advertisement, are reviewed to give context to the analysis above. Causal relationships are then drawn from the data to the conceptual framework that relates the outcomes to such theoretical constructs as Effective Frequency and Wear-In/ Wear-Out Theory. It kept the investigation of the relationships between user behaviors, ad design, and recall outcomes systematically comprehensive.

# 4.2. RQ1. How does varying ad frequency influence memory retention and recall rates of static banner ads on social media platforms?

This means that ad frequency greatly affects the awareness level of the user and the level of interaction with the advert, with the best effective average ad exposure coming to between 3-5 instances a week. This is consistent with earlier studies pointing to the fact that excessive use of these features results in diminishing usability, decision impact, and user annoyance. Based on theoretical frameworks, namely the Effective Frequency and the Wear-In Wear-Out Theory, these suggested that a delicate mix between the manner of exposure and involvement is critical in a pursuit to attain maximal ad persuasion while at the same time addressing the issue of ad surge.

"So memory recall is that how much time the same ad appears to the customer basing on their specific interest relevant to the ad you can say. So this is my whole answer to this question that ad frequency is about the number of time that let's the image appear to a user and recall is about depending upon your interest factor how many specific time it appears to the consumer when it is specific keyword or interest in the search bar of the specific social media platform." (Interviewee 9).

"Younger audiences, like Gen Z, have shorter attention spans and tend to get annoyed with repetitive ads quickly. They prefer dynamic content and storytelling. Older audiences are more forgiving and often need higher frequency to take action. I've also noticed geographic differences—urban audiences, for instance, tend to fatigue faster than rural ones due to higher overall ad exposure." (Interviewee 1).

High ad repetition leads to diminishing ad effects due to early message familiarity; and ad annoyance as a result of mental processing overload; therefore, frequency and spacing of exposures are important (Schmidt & Eisend, 2015). Younger broadcasters or viewers, especially generation 5 or Gen Z, are less patient with retelling of the same advert due to their quick attention span and fast switching in their digital lifestyles. The new generation requires a less invasive approach to advertising, while audiences with higher retention capacity are likely to respond better to conventional methods. These results underpin the centrality of ad frequency and content differences to demographics and the need for a more balanced exposure-reality placement not to annoy users (Dwivedi et al., 2021).

"Static banner ads will continue to have a role, especially for awareness campaigns. They're cost-effective and less intrusive than video ads, which makes them appealing to certain audiences. That said, the demand for dynamic and interactive content is growing, especially among younger demographics. Static ads will likely need to adapt by incorporating more innovative designs or being used in conjunction with other ad formats like carousels and videos." (Interviewee 2).

"One approach I've found effective is using sequential messaging. Instead of showing the same ad repeatedly, I create a series of ads that tell a story. Each exposure adds a new piece to the narrative, which keeps the audience engaged while reinforcing the brand message." (Interviewee 4).

With sequences of ads that relay messages that are interrelated to each other, the problem of ad fatigue is overcome since there is continuous engagement, which also makes brand narratives more impactful. This reduces annoyance resulting from repetition and enhances recall, as has been advocated by Bleier and Eisenbeiss (2015). Non-disruptive banner ads are less obtrusive and can afford marginally higher exposure rates than video ads, which are used when there is high interaction but could get saturated when exposed frequently (Todri et al., 2020). Thus, the subject under investigation reveals the appropriateness of differentiated choice of ad format depending on the goal set – with a focus on static format for long-term impact and video for short-term, highly stimulating objectives.

"Static banner ads, being more subtle and less intrusive, can generally tolerate slightly higher frequencies compared to videos or animated content. However, even with static ads, the design matters a lot. A simple and clean design with a clear message is less likely to annoy people, even at higher frequencies. On the other hand, overly flashy or overly complex designs can lead to faster fatigue, regardless of how often they're shown." (Interviewee 11).

The Bleier and Eisenbeiss (2015) results argue that because personalized advertisement reduces the tolerance threshold of users to higher frequencies, recall is also boosted due to more user engagement. Targeted approaches guarantee the right content gets to the right people eliminating concerns associated with repetition. The ideal number of advertisements that appear when they should be run is crucial; middle runs are the most effective to garner recall as running them too often can irritate the audience. Other advertising techniques like frequency capping and others such as sequential narrative achieve this to a great extent. Static ones, as less invasive, can boost more occurrences than videos which themselves need proper positioning. An analysis from the demographic perspective shows that the easiest and most preferable ad strategies for Gen Z are creative low-frequency, while for the other audiences, consistency is the best approach (Dwivedi et al., 2021; Todri et al., 2020).

The location of the adverts is important in defining recall and interaction levels on social platforms. Feeds, Stories, and Reels are the main placements available on such platforms as Facebook and Instagram, and each of them targets different user's actions and interactions with the content. Research indicates that Feeds create the most recall by bar, given that Feeds' position is more noticeable and recognizable; the Stories and Reels create more significant interaction since they are more engaged and engaging. This response also reveals how Feed ads can be attention-grabbing. Feeds are designed for browse–level and detailed access, which makes the concept suitable for static banner ads. Sharma and Ashfaq (2023) have conducted research that endorses this statement proving that Feed ads give better recall rates as more time is spent interacting. Static ads should be placed in Feeds where marketers want to target their campaigns to build brand recall and awareness.

"I usually notice ads on the Feed because that's where I spend most of my scrolling time. Stories and Reels are too fast-paced, and I tend to skip them." (Interviewee 1).

"I find Stories more engaging because they feel less like advertisements and more like content. I tend to skip ads in the Feed because they interrupt my browsing." (Interviewee 13).

This is because stories blend into the ad viewing pattern by fitting into the user's normal routine, perceived to be less obtrusive. This is consistent with the work done by Muñoz-Leiva et al., 2021 who explains that Stories perform well in terms of effectiveness rather than Feeds

because they immerse. Their fast speed may ability a lower brand recall in the user's mind, a finding that implies Stories are more appropriate when used for high engagement rather than brand recall campaigns. When it comes to recall, Reel ads are problematic because they are short, and the user quickly scrolls through them. Bellman et al. (2020) also found that content in dynamic video formats such as Reels needs to be Interesting so that people remain attentive and enhance their memory. For Reels, marketers bear the most responsibility to make the ad content compelling and interesting enough to grab the viewers' attention for only a brief moment.

"I rarely engage with Reel ads because they feel too quick to make an impression. I might remember a video if it's highly creative, but most of the time, I scroll past them." (Interviewee 3).

"When I see an ad at the top of my Feed, I'm more likely to pay attention to it compared to ads further down the page." (Interviewee 14).

"I think ad placement matters less when the content is highly relevant to me. If the ad feels personalized, I'll notice it regardless of whether it's in the Feed or Stories." (Interviewee 5).

Placements carry considerable impact on recall and conversion where Feeds and Stories at the top of a screen have the edges over other kinds of placements (Namin et al., 2020). Newsfeed is best for static or recall advertisements, while the 'stories' offer high involvement. Nonetheless, reels though trendy, require incredible input to opt for because audiences have short spans of attention. Personalization improves ad performance in all placements as message-personality appeal grabs users' attention irrespective of ad position (Bleier & Eisenbeiss, 2015). When done correctly, marketers will be in a position to maximize the chances of ad effectiveness through strategic placements and highly relevant content. Instagram also, like Facebook, provides more specific opportunities to plan campaigns according to preferences and usage patterns.

# 4.3 RQ2. What is the optimal ad frequency for static banner ads to maximize recall without causing ad fatigue among different user demographics?

Age, gender, and location generally have a bearing on how one perceives advertisements and reacts to them. A younger-aged audience that accesses content at very high rates especially by the internet, is sensitive to repeated ads; advertisers should, therefore, adopt dynamic and more creative content that does not make audiences develop fatigue (Gemenis, 2023). The characteristics of regional preference also influence ad effectiveness and stress the necessity of the culture-sensitive approach. These results emphasize the necessity of such distinctions focusing on demographic targeting; it is, for example, demonstrated that young people prefer interactive and different materials while older persons might find traditional forms more effective. Such targeting helps enhance ad relevance and makes better attempts to bring high ad recall across audiences (Dwivedi et al., 2021).

"The younger generation is more likely to disengage with repetitive ads quickly, while older generations tend to be more patient and engage with ads longer" (Interviewee 1).

"Facebook doesn't Tell this kind of data, it only gives you the warning of like Uh, ad fatigue. So, that doesn't give you data about, like, which age is getting Most your ad is rotating in, which age private, so they only tell you that your ad is 15, your creative is predict. You need to change that. So, And we, and it's obviously, when you run a campaign, it automatically starts serving to order. Similar age bracket so suppose, if you are using like 18 to 60 audience, and when you started a campaign and it's maybe the first person or maybe the first 10 percent clicked on ADD and there from like 25 years of age. So Facebook will start pushing more into this age and they will ignore any other kind of age brackets. So obviously that's the audience which are most likely to get And that's the audience, which is also seen that add multiple times." (Interviewee 5).

This feature proves that location and audience size play a significant role in determining ad frequency strategies. Utensils that have low population reach result in the skewing of reach comprehensively to target audiences repeatedly, resulting in ad fatigue. This Nietert (2020) supports the findings by De Maio et al. (2020), who pointed out that while it is crucial to be often, the message cannot go too often, and in the smaller target markets, it can even be too much. Advertisers willing to penetrate the smaller regions need to marshal audience segmentation and tailor their messages as a way of neutralizing and reducing the chances of repetition. It is equally important to note that different ads appeal to different genders; the response above is a clear example. Dwivedi et al. (2015) have explored that personalization, such as gender target, affects the relevance of ads more effectively and the overall satisfaction of users. For female audiences, one could appeal to the beauty and for them to feel the emotions of the product, while male audiences might need a simple value proposition.

"We usually tag personalize their pain point. We usually personalize their age, and we usually person like their game because also like, for instance, like Are you 40 plus and living in New York? I have something for you. Eh, are you a female and looking for a relationship? This app can work for you. So something like this, okay," (Interviewee 9). "Definitely I mean different age groups, different genders will show different reactions on the different part of the world. So you can have really noisy full of music advertising in South America. I don't think you can do the same thing in Saudi. No. Yeah." (Interviewee 7).

"and if we are talking about specific age groups so yes for specific age groups let's say the idea of the ad is it static is it a video it plays the crucial role and the concept and even the frequency so young people will be annoyed in less time than adults or older adults or elderly even" (Interviewee 8).

Age has a strong influence on ad attentiveness and ad recall in particular, whereas young people prefer diverse and more unconventional advertisements and middle-aged and elderly people focus on advertisement relevance and regularity (Fischer & Reuber, 2014). Another limitation is how culture affects ad effectiveness, in that culture-consistent advertisements are more appealing than culture-induced messages that are unappealing (a and b). Gender-sensitive preferences add to the overall idea of segmentation and personalization even further. Design, passion, and cultural relevance are significant in getting audiences from all groups involved. Due to user characteristics, there is a need for more contextual and timely advertising to avoid its repetitiveness and enhance advertising outcomes (Dwivedi et al., 2021).

The timing of the ad is seen as very important in ad recall, and the perception is that there are specific times of the day and week when recall rates are high. These findings suggest that recall is much better when ads are seen during off-working time rather than during working hours because of distraction. They also become active on the weekends because the users spend a lot of time on social media. Such findings have similar implications to those of current studies, which cite that most individuals are likely to use social media during the early evening while they are still out of work. It was also evident that the early evening period offered a good opportunity because it is a time when people are more welcoming to content. Marketers could then use this knowledge and place commercials during these peak intervals so as to gain a high response rate with users.

"So I would say the the add frequency Has several. King components and aspects. So one of them would be like what you want to achieve in general. So if it's Uh, brand building. So let's say some new brand is coming into the market or established just a new product. So you need a definitely a higher Frequency in order for customer to start to memorize you. Uh and uh it's not only about the frequency but as well about the leading element. So first of all, it's What kind of? Real estate on the media, you are getting. So let's say if it's some like small banners, or whatever. Let's say as on most of the websites, somewhere on the right hand side, so those Get. Quite slow

attention. And they are not effective in that sense or you need to actually have even higher frequency in that sense. If it's Like a premium real estate. With large formats, then it's like a good as a format to make an impact. Uh and and so you need slightly less of a frequency again. Some, let's say. Content context, how you explain your brand as well, really? Meaningful. Because if you would show just a brand for example, nothing else, what the brand does. So, typically customers might some of them might get curious. So what is it? So you still need a storytelling element to whatever you do in marketing. So, basically telling what your brand is, what kind of problems does it solve? For it to be an effective. A branding campaign and if we go to like a performance oriented. So, typically in most of the cases, Uh, the highest performance. Ratios are achieved with. First impression. So Uh, either somebody is clicking or not, the the ctrs are dropping with each and every second impression. But on the other hand side, depending on how you buy this media in some cases if it's a CPC buy. So then for you that frequency element is not, maybe that harmful and you might obtain, okay, show 20 times a day to someone, regardless, if he clicks or not. And even though with a lower lower chances of it to actually grab a click an attention but still if it doesn't cost you. So sometimes you might opt in for that. Of course, some some As well. Referring it's not. One thing is brand fatigue when when you simply let's say start to not notice a brand or a product promoted but sometimes without too much of an intrusiveness, you might Your user's best about you and inflict like a negative emotion about the brand. So that should be one of our considering elements and, uh, one of Criterious where wherever you are considering or let's say are measuring frequency. So its frequency over the time. It would say to establish a brand, a good brand recognition, for a new brand, you need. Impression frequency of 20. So what that means you might show 20 Impressions an hour a day or over course of the month for over the course of the year. And that will make a really different effect on on users. So without time parameter, the frequency parameter is pretty much. Just a half of the story." (Interviewee 5).

"I would say that the moment that they see or check out the landing page, that that's the time that they, you know, that's the time that they are going to be seeing it on other on other platforms, or omni channel, is what we say" (Interviewee 15).

This response shows how the day of the week affects engagement with ads. Based on the study, audiences are inclined to spend time with advertisements over the weekends. They are likely to be relaxed and have less working pressure. This is in consonant with behavioral studies, which propose that leisure time helps to improve ad recall and the chances of increased interaction. This will serve as a reminder to marketers that they should always time their high-value campaigns during the weekend because users are more responsive at that time. As it should be observed from

this respondent, morning hours are not very productive when it comes to ad recall because of other activities. This observation aligns with previous studies that examine people's digital consumption patterns, where early hours in the day are usually characterized by utilitarian uses of devices as opposed to passive scrolling. Marketers should not waste time targeting anyone in the morning because the impression reception will not be optimal, and users' attention is divided.

"Morning ads don't catch my attention because I'm usually too busy getting ready for work or checking emails" (Interviewee 3).

"Late-night scrolling often makes ads feel intrusive because I'm usually tired, and I skip through them faster" (Interviewee 4).

"I tend to remember ads better when I see them right before lunch or dinner because I'm already thinking about what to eat or shop for" (Interviewee 5).

Ad timing is a vital factor influencing recall and response whereby evening times and weekends are preferred viva the sporadic and high attention span from users, particularly in the morning and at night, when users are usually busy or tired. Conventional timing, for instance, associating commercials that are food-related with the meal periods, will improve the effectiveness of the ads. Impressive information is less useful at such times because people will have less capacity to process it after getting fatigued during late hours. To avoid ad fatigue, marketers should incorporate analytics to understand the best time and days for the posts to be posted and, in the process, align with users' behavior patterns to maximize the campaign and campaign while minimizing wastage.

# 4.4 RQ3. How do personalization and content quality of static banner ads affect the tolerance for higher ad frequencies in enhancing memory retention?

The numerous factors that determine ad complexity always affect user engagement as well as recall in a big way. Indeed, simple ads may be more effective than complex ads in terms of attention because they do not overload a user. However, the content's information value and relatedness also have their roles in dictating the level of engagement, making the level of difficulty central. Such a response also shows the appropriateness of simple designs in adverts. Bočaj and Ahtik (2023) investigated the effectiveness of less visually complex banners and determined that they improve the level of banner non-emption. Total global mini messages allow advertisers to deliver just the main points of the ads in question so that the audiences do not overload, retaining the material in question. This approach is consistent with the general principles of interactivity in digital advertising: The less complex the advertisement, the better the click-through rates are.

"Simple ads with minimal text and clear visuals are more appealing to me. I find complex ads overwhelming and often skip them." (Interviewee 1).

"If an ad is too basic, it might not grab my attention. I prefer ads with an element of surprise or something unique that stands out." (Interviewee 2).

It is within this context that the balance in ad complexity is pinpointed for stressing. However, which never hurts, creativity can be shocking and eye-catching, offer customers something unexpected, and make an ad stand out. Writing Yang et al. (2021) point out that the use of moderate ad complexity and differentiation can lead to high engagement without overwhelming cognitive load. That is why, for marketers, it is important to combine simplicity with personality, making the ads visually appealing and fun. Useful information is beneficial to AdWOS since ads are only intrusive to users who are already seeking the services or products advertised. Casado-Aranda et al. (2022) also pointed out that informative advertisements created a positive impact, specifically on information recall, since such advertisements meet the users' information needs. These marketers can exploit by including details in the advertisement while at the same time not including so much flash in the ad as this will affect the message being passed.

"I enjoy ads that are informative, especially if they provide details about a product or service I'm interested in. Overly flashy ads can be annoying." (Interviewee 3).

"Sometimes, ads with too much text lose my attention quickly. I prefer visual ads that convey the message in a single glance." (Interviewee 4).

"For me, ads that tell a story through visuals or animations are more memorable than static ones with lots of text." (Interviewee 5).

Dynamic visuals or animations add an emotional appeal to storytelling where customers feel that adverts are telling a story and, therefore, have an appeal to memory, as ads apply specific narrative appeals (Bellman et al., 2020). The apparent message, with a few words of text and high-quality images, is another crucial concept in working with an audience's attention and memory. Simple, concise, and specific instructions enhance recall while eliminating interest. Creating sets also shields against user disengagement (Diao & Sundar, 2004). It is, therefore, important for ad creatives to be both basic and use ingenuity and communication as tools in order to make a point without the need to grab focus. The combination of dynamic visuals and previously designed tool-assisted narratives is effective to an extent; this complies with the notion that the actuality of ads

with moderately complex structures is efficient in retaining user interest without distracting the audience and stimulating as much engagement and recall as possible.

Many studies have confirmed that ad quality has a direct impact on recall, engagement, and user trust. Appealing advertisements with superior pictures and clear messages bring high levels of consumer engagement and robust recall, while low-quality advertisements reduce both engagement and trust. Thus, there must be a harmonious determination of such factors as beauty and informativeness to keep users lively without boredom. This response focuses on visual attractiveness along with usability when designing ads. Abstract In response to the growing evidence for the effects of high-quality visuals on learning, the current study examines how highquality visuals enhance memory function by engaging the cognitive and emotional sections of the brain. Thus, marketers have to pay attention to those pictorial images that create an emotive appeal to ensure that consumers are more likely to develop ad recall.

"If the visuals are appealing and the message is clear, I'm more likely to remember the ad. Poorly designed ads just make me scroll past them." (Interviewee 1).

"I prefer ads that are professionally done. If the quality is low, it reflects poorly on the brand, and I'm less likely to trust them." (Interviewee 2).

"An ad with good content and design sticks in my mind longer. If the content feels rushed or generic, I lose interest immediately." (Interviewee 3).

This feedback proves that content quality is the key to maintaining users' interest in the materials provided. Specific and well-conceived communication strategies are also consistent with the notion that greater ad appropriateness improves communication. Marketing takeaways, hence, should focus on creating content that is relevant and specific to consumers in order to create long-term retention. This fact proves that there exists a correlation between the quality of ads and brand image. With low-quality ads, a brand can have very negative effects on the users and the overall loss of credibility. Research shows that such high-quality ads are found to be more credible by their users – the latter influences brand recall/loyalty, hence why it is very important that professionalism in terms of design and the marketing message can be attained in advertising.

"Dynamic and visually engaging ads grab my attention more than static ones. But if they're too flashy, it becomes distracting." (Interviewee 4).

"Sometimes, ads with good-quality visuals but no clear message feel like a waste. I need both to be interested." (Interviewee 5). The message content and design of advertisements should be of high quality so that people pay attention, trust, and can remember; low-quality ads deter this. Good advertisements make it possible to add fun to the ad without complicating the users' understanding of the ad (Bellman et al., 2020). Interest and retention effects are also added by personalization and the appeal to the viewers' emotions to assess the quality of ads from their angle. Marketers should focus on the professional appearance of the posts as well as the substance of the posts to obtain the greatest results. It can be concluded that analysis of real users' reactions to ads can be beneficial for ad quality optimization to increase users' trust and get higher CTR and recall rates to send a campaign in effectively competitive digital environments (Diao & Sundar, 2004).

# 4.5 RQ4. What are the long-term effects of ad frequency on brand recall and user engagement with static banner ads on social media?

Ad interactions include likes, shares, and clicks, and there is a positive association between these and ad recall. Lastly, the type of involvement that the users pay with an ad helps to ensure that the brand's memory is created due to the creation of an active cognitive link with the brand. Other writers, such as Obal and Lv (2017), show that engagement through interactive ads leads to increased brand recall, which is higher than that created by non-interactive pieces. The clickthrough rates (CTR) and post saves are deemed standard measures of engagement and, hence, the ability to recall the brand. This is where relevance and appeal individually come in as determinants of engagement and subsequent recall. The publicity that is relevant to users is more likely to elicit a response by creating a more favorable storage connection. These findings are in line with the research done by Bleier and Eisenbeiss (2015), who also find that personalization and relevance improve the impact of engagement-based ad recall. Marketers should target ads at a single user profile to ensure as many people interact as possible and, therefore, get more recalls.

Response 1 "Engagement metrics are my go-to, particularly post saves and shares. Post saves are a strong indicator of recall because people are making a conscious effort to revisit the content later. Comments and shares also provide insight into how memorable or impactful an ad is. If the platform supports brand lift studies, I use those as well, though they're not always available." (Interviewee 9).

"Engagement metrics like CTR, post saves, and shares are really valuable. Post saves, in particular, are a good indicator of recall because they show that the user found the ad memorable enough to revisit later. If available, I also rely on metrics like impressions versus unique reach. A

high number of impressions compared to reach indicates that the same users are seeing the ad multiple times, which directly ties back to recall.." (Interviewee 1).

"Maybe in terms of engagement, we say that whether they reacted to the ad, they opened it, or they played. Maybe they just played the video or ignored it. or maybe they don't remember it at all. Yeah, there are different possibilities with that. But we cannot really tell for sure until we send them the brand ad recall survey so that they can answer." *(Interviewee 11)*.

The interactions by clicks are more likely to be intentional than mere exposure, which makes more recall of such interactions than the other forms. This is true, as Li, Sun, and Montaner (2018) noted that their experimental results demonstrated increased recall by the use of clearly defined CTAs in ads. Advertisers can use this to their advantage by providing adverts that are relevant and directly related to the needs of the user. Thus, the saving of ads is in a higher degree than viewing or clicking, indicating that the user values the content greatly and would like to save it. As explained by Kristian Maxwell post saves give insights of the recall as they imply that the user will come back to it at some future time. This points to the need to offer content that will be memorable to the users thus creating related solutions highlighting the importance of offering content that people will remember and this includes; educational or solution-oriented content.

"And again it is also depend upon your demographic you can say if it is some sort of the awareness based stuff public service message. I think the average frequency is around to be the one to four time a week you can say. So basically the sum of this question the engagement the relevant score budget bidding the type of the creative that you are utilized the copies you are utilized and monitoring the audience. These are the important factors that might be impact on your algorithm and the frequency of the ad." (Interviewee 9).

"I rarely engage with ads unless they're interactive, like a carousel or quiz. Those stick with me more than static images." (Interviewee 5).

Dynamic ad formats, including carousels and game-based materials, help to engage users more and increase retention as long as they develop unique interactivity with the content. Social proof such as likes and shares increases ad trust and people's interest due to perceived ad legitimacy; the more an ad is validated, the more credible it is (Sanak-Kosmowska, 2020). Such as the number of times the post was saved. As for the specifics of the users' intent, merely looking at numbers as the primary KPI tends to indicate that it is high time for ads to bring value. To ensure people pay attention to ads and remember them, advertisers should aim at making everything as personal as possible, make the Call to Action persuasive, and include items that draw engagement. Combining social validation with value content increases sustained effectiveness and brand clientele during remarkable advertising rivalries.

Organizations face the problem of standing out in the cluster environment that is typical for the digital advertising industry. Benchmarking tends to weaken brand recall, which makes it very important for advertisers to come up with unique and memorable adverts. The empirical studies reveal that having unique visual and content elements greatly increases the chances of mere citation amidst similar competitive ads. This response suggests that further efforts should be made to simplify the advertisements and to differentiate them to stand out from consumers' similar advertisements' point of view. Research by Vakratsas and Ambler (1999) have shown that there is a positive correlation between distinctiveness in visuals or content and awareness implying that clients are likely to make extra efforts in solving a problem if they have spent considerable efforts in processing information. Marketers in developing eye popping compelling ads that would attract and maintain consumers' attention in congested environments.

"It depends on several factors. First, I consider the campaign's objective. If it's awareness, I aim for 4-6 exposures over a week, as the goal is to make people remember the brand, not necessarily take action. For conversion-focused campaigns, a slightly higher frequency, around 6-9, often works better. I also look at the stage of the audience in the funnel. Cold audiences may need more exposure to become familiar with the brand, while warm audiences—those who've interacted with the brand before—respond better to fewer, more targeted impressions." (Interviewee 14).

"I would love to have more data from a meta-perspective. You used to be able to run ad recall or brand list campaigns but they've taken that away now from the awareness. It's very much more just broad reach. and again I do get served surveys in my Instagram where if I do you remember any of these ads for the last few days. and it's hard because no matter." (Interviewee 11).

This finding supports the theory of novelty effects whereby ad elements that in some way seem unfamiliar elicit attention and enable people to remember the adverts better. According to Yaveroglu and Donthu (2008), competitive clutter is a major concern, but creative differentiation is what makes it possible. Thus, using surprise in advertisements helps marketers to tackle the problem of the saturation barrier. This response also acknowledges the problem of infringement, where similar ads tend to reduce brand frequency. Schmidt and Eisend (2015) noted that when exposures are fixed in competitors, there appears to be an increase in cognitive intrusion, which may lower ad effectiveness for all individual advertisements in a given cluster. To overcome this,

marketers should design the messages of their brands and the timing of their release in such a manner that they do not conflict with competitor brands.

"Ad fatigue often leads to a plateau or decline in engagement metrics like CTR, which indicates that people are tuning out the ad. While the ad may still be remembered, it's often remembered negatively. This can harm the brand more than help it. That's why I prioritize refreshing creatives at the first sign of fatigue—keeping things fresh ensures the audience stays engaged." (Interviewee 2).

"It is like that because we need to accept the fact that in the digital world nowadays a person is facing at least 1,000 different brands per day because even if we navigate in different pages going into different apps, we are seeing those brands. And if we want to actually be recalled as a brand we need to stand out and of course we need to have a frequency and for me it seems that seven per week in one channel is okay not annoying and can be recalled somehow.." (Interviewee 8).

"so for that especially in the Christmas period usually the brands are also fighting a bit whose ad will be the most liked and the most recalled during that period because there's no secret that it is very bloody competition during the Christmas who will get the more spots not only according your competition but basically you are competing with everybody on that time.." (Interviewee 15).

Brand identity association consequently illustrates increased recall in competitive signaling systems by the steady use of colors, logos, and messages (Vakratsas & Ambler, 1999). Interactive aspects take the viewer to another level of engagement and memory, resulting in interactivity improving overall recall; according to Voorveld et al. (2018), interactivity makes a branding experience more effective in crowded spaces as they become more engaging. Finally, marketers should focus on strategic creativity not only in terms of visuals and designs but also in terms of the type of content they offer and how consistently they brand it. Utilizing analytics in situ to rate competitive patterns and predicting ad location provides guarantees that compiled campaigns seldom go unnoticed and are instead noticed and remembered in the info sphere noise.

# 4.6 Summary of Key Findings

Examining the quantitative universal analysis of parameters provides important data to understand advertising recall, interaction, and success. Ad Frequency became the least significant factor, and, as the research showed, seeing ads 3-5 times per week helps to increase recall but not to create ad fatigue. Repetition has a detrimental effect on interest, as corroborated by the Effective Frequency Theory superimposing a reiteration value. Sequential and personalized ads eliminate the probability of cognitive load, as the user responses and previous literature indicate.

According to demographics, the results demonstrated that younger viewers were even less patient with plain repeats of ads and more open to new ad types. In addition, Area and cultural preferences were recognized as critical factors that call for more localized as techniques of communication to increase the chances of a recall. These findings also endorse theories of audience segmentation and personalized targeting. The Time of Exposure variable brought out the fact that there is a right time to be exposed to the message in question, with early evenings and weekends being the most effective. At the same time, others were less effective, particularly in the morning and late at night, since they were subject to distractions and user fatigue. These findings are related to behavioral theories that assume more enhanced cognitive preparedness during free time.

Ad placement also details that feeds are most suitable for static ads and stories for interactive, always active campaigns. Reels, in the process of becoming trendy, are best tackled by really great ideas due to the nature of their brief life span. These results are consistent with the literature on the platform-specific use of platforms and content consumption. In terms of ad Appeal, Ad Complexity confirmed what previous studies also showed, that simple ads with clear visuals and short texts were appreciated by users. But moderate complexity, which incorporated creativity or information was found to increase interest. This accords with the assumptions posited by dual-process theories of cognitive elaboration, which recommend the integration of both simplicity and elaboration.

Advertisement quality was always associated with recall and trust, meaning that highquality visuals and cohesive messages fostered stronger and better user associations. As with the case of Recognition metrics like Views, Clicks, and Shares, Carry-through engaged, all while the interaction models endorsed recall through positively interacting with the Engagement metrics. The last of the analyzed subtopics in the Competitive Landscape was the problem of differentiation in oversaturated markets. Competitive interference was deemed to be addressed by visual differentiation, where the brand received a consistent look and feel, with interactivity also forming part of the solution, which was revealed to marry theories on ad distinctiveness and brand identity. Altogether, the findings presented above offer a clear-sighted vision of the integrated relationship between the user's behavior, the advertisement layout ,and recall.

## 4.7 Discussion of Results

This section provides a discussion of the study findings in regard to empirical literature and theoretical perspectives. It focuses on the interactional effects that the number of repetitions, target groups, time of advertising exposure, advertising positions, ad complexity, ad quality, and competitive environment have on ad recall and consideration. Some important trends, findings, and implications for marketers are identified and discussed in the context of the results while relating them to the relevant theories, including Effective Frequency Theory, Wear-In/Wear-Out Theory, and cognitive processing theories. The results further support the notion that ad frequency is indispensable in determining recall and subsequent interaction. Biased exposure once to five times per week is recommended for the best result but not too frequent to cause forgetting, thus backing Krugman's Effective Frequency Theory. Theodi approaches like repetition harm retention because the brain gets oversaturated, as Schmidt and Eisend (2015) underlined over the concept of duplicity. Ad interestingness and interest evolution also supported the concept of dynamic content sequencing (Bleier & Eisenbeiss, 2015). Personalized advertisements and sequential storytelling have proven to reduce ad fatigue successfully.

Besides, static banners received a higher number of TOL for repeated exposure compared to video ads, implying that less invasive structures do not cause fatigue Consequently, there was a realization in support of Todri et al. (2020). All these points show the need for a frequency cap as well as adopting strategies based on individual ad formats and target audiences. The concern of age, sex, and geographical origin may truly influence users' interactions and their memory of the stimulus. Gen Z especially had zero patience for the same ad that re-runs itself over and over again; therefore, new interactive formats had to be introduced. This finding is in line with Gemenis (2023), who pointed out the need for dynamic content that targets young people. On the other hand, Fischer and Reuber (2014) stated that older audiences were more accepting when there was consistent and message-related content.

Other aspects, such as region and culture, were also important determinants of the ad impacts, urging the need to segment the approaches. According to Goldfarb and Tucker (2011), cultural compatibility is appealing, but culturally incompatible ads do not have that appeal. The study of gender differences disclosed a variety of preferences for the advertisements and highlighted the importance of segmentation and targeting tools for improving the ad experience.

The timing of ad exposure also highly influenced recall and engagement. The findings identified running of campaigns as most effective in the early evenings and during weekends because these are periods when users are most likely to be receptive. Moreover, these results are congruent with those of Heflin and Haygood (1985), who pointed to leisure time as the best time for recalling advertisements. On the other hand, mornings and particularly late nights were less efficient because of interruptions and exhaustion, as confirmed by the effectiveness of ad scheduling according to users' increased activity. Other timing techniques include contextual timing, like running food-related advertisements during meal timings, which adds even further value to relevance and recall. This corroborates the situational relevance theory on the premise that the timing factor enhances advertisement effectiveness (Dwivedi et al., 2021).

Advertisement placement also appeared to have a strong influence on acceptability and recall. Disclosure: It was found that feeds work best with a static advertisement for awareness, whereas stories are best for engagement, requiring user interaction. As reels became more popular to use, creativity was needed to overcome issues with viewers not wanting to pay attention for long. These results align with those of Voorveld et al. (2018), who concluded that interactivity increases attention in competitive contexts. Another key optimization area was the strategic location; for example, ads placed near the headers have shown an increased likelihood of being viewed and remembered. Namin et al. (2020) discussed that the visually dominant positions improve the ad impact, underlining the relevance of top locations. Personalization was said to have compounded the effects of placement in accordance with the findings by Bleier and Eisenbeiss (2015).

The findings of the research showed that it is not appropriate to draw a straight line between ad complexity, engagement, and ad recall. Simplicity was stated as another principle; simple visuals and simple messaging cut down on complexity and boost retention numbers. Bočaj and Ahtik (2023) focus on the fact that the less complicated the ads are, the better they work to attract the users' attention without overwhelming them.

However, the combination of moderate complexity and creative and informative features provided a better result, which is supported by the dual-process theory of advertisement processing (Bolls et al., 2003). The appeal was also given an added boost using dynamic visuals or animations as the use of stories evokes deep impressions due to its tools for flow and emotion (Bellman et al., 2020). Only high-quality ad content with a clear and appealing message was observed to reinforce trust and memorability among the participants. At the same time, other poorly designed ads still had the potential to drag down the credibility of the branded product. Casado-Aranda et al. (2022) noted that the website's and the content's aesthetic and quality decide user engagement and dormant user retention. The intensity of the perceived quality was additionally stabilized by the factors of personalization and appeal to emotions identified by Diao & Sundar (2004).

It was important to focus on both the creativity of these ads, as well as their simplicity and relevance to the audiences. An expert design, carefully chosen content, and constant updates of the sites were identified as the key components that explained the users' interest and trust in the sites. The competition was present in the sense that advertising the product to the target market was difficult in the wake of competition from similar advertisements. In light of these features, it was established that attention mechanisms comprised visual differentiation and innovation of content, as well as interactivity. Vakratsas and Ambler (1999) also stated that 'consistency builds brand Equation [recall] whether or not other brands are the audience.' Including social proof, including likes and shares, increased ad credibility and engagement, as Sanak-Kosmowska (2020) pointed out.

To minimize or eliminate the act of competition interference, marketers have to create campaigns that are unique and relevant in every sense of the word. Using complex analysis to pinpoint the competitors' trends is useful in terms of synchronizing timing and positioning to guarantee that the advertisements will be seen and then remembered in the information noise of Internet media environment (Chen et al., 2012).

Some of the theories supported by the result include; Effective Frequency and Wear-In/Wear-Out Theory. Krugman (1972) came up with the Effective Frequency Theory, and Pechmann & Stewart (1988) developed the Wear-In/Wear-Out Theory. Cuellar (1996) agrees that simplicity and relevance help in recall and supports this with cognitive processing models, such as Atkinson and Shiffrin's (1968) memory model. The results also confirm situational relevance theory and two-process theories, such as the timing of the content's delivery, the content's difficulty, and the user's actions. These theoretical linkages make for a strong theoretical foundation on which to base an understanding and improvement of ad efficiency.

T hey emphasize the crucial nature of that relationship between users, advertisements, and the context of use in which those advertisements exist. Some of the insights are as follows: There is a need to get the right frequency and ensure that the strategies meet the demographic/regional preference, the right time and place to place the ad and that the ad contents are of high quality and interesting. These research findings can be easily incorporated into existing theoretical frameworks through which marketers create effective and relevant promotional strategies with the goal of improving recall, interest, and believability. They afford some useful advice for designing effective advertising campaigns in other commoditized digital spaces.

### **CONCLUSION AND RECOMMENDATIONS**

## **5.1** Conclusion

The study increases one's knowledge of what constitutes the major determinants of the impact of social media advertisements, where such aspects include the frequency of the advertisement, demographic targeting, time of exposure, location, complexity, quality, and competition. The outcomes showed that an ideal level of advertisement exposure of three to five exposures assists in recall without leading to fatigue, as asserted in Krugman's Effective Frequency Theory. The levels of exposure reduce consumers' engagement, yielding to the importance of frequency capping as a marketing strategy (Hussain et al., 2018).

The purpose of this research was to fill the gap existing in the digital marketing literature by estimating the effects of ad frequency on memory and recall rates of static banner ads on social networks. As the study has suggested, when relying on the literature review, developing a conceptual framework, and conducting the empirical analysis, the results offered substantial insights on potential ways of enhancing advertising effectiveness for the online static banner ad.

The empirical evidence of the study was compromised by a theoretical hypothesis that suggested the existence of an ogive ad frequency that would improve memory recall rates. In particular, the frequency of three to five static banner ad exposures per week is optimal, given the concepts on the basis of the Effective Frequency Theory by Krugman. If frequency capping exceeded this level, the results reflected decay and negative user reactions, which proved that frequency capping was a rational instrument in the context of digital advertising.

Gender and age had significant implications in responses to ads' frequency according to the demographic profile. Younger immunities could afford contradicting and spectacular creative visuals, while older immunities needed regular, yet less frequent, exposures. Such insights make clear a necessity for individual and distinctive advertising approaches for each layer of users.

The main conceptual model used in this study emphasized the relationship between ad frequency, ad content quality, and the level of personalization. The study also found that with increased tolerance, ads with higher frequency containing high picture quality and strong communicative appeals were better recalled. Moreover, the targeted ads, in consideration of users' interests and activities, boosted the level of interactivity and resulted in memory retention.

Hence, the study concludes that advertisement frequency capping should be practiced by different advertisers to maintain their visibility and improve quality adverts by providing customized, high-quality content. Moreover, the breakdown of the target audience according to demographic characteristics and activity is necessary for setting appropriate rates and ad messages.

This research, therefore, adds to the available literature on frequency and memory retention; however, it also points to directions for future research. Future research based on longitudinal data to test the impact of ad frequency and the use of dynamic parts in complex static ads can be continued to refine every strategy.

Last but not least, it presents findings that will be useful for advertisers to boost the impact of their static banner ads and fulfill the objective of improving recall and attention levels without overloading the target audiences.

Analyzing demographic data revealed the following large discrepancies: while youngsters better engage with formats that offer interactivity and new solutions – seniors respond better to consistent and easy-to-understand messages (Dwivedi et al., 2021). Regional differences added to the mix increased the need to localize advertisements to reflect certain cultural standards (Goldfarb & Tucker, 2011). The time that the information was presented also greatly influenced recall, with early evenings and weekends being more effective because it is users' free time (Heflin Haygood 1985). Four ad types were considered to be less effective: those that were placed in the morning and late at night when users are likely to be distracted or grow tired. Similarly, the placement of ads influenced recall; Feeds offered better static ad memorization, while Stories engendered dynamic format insights (Muñoz-Leiva et al., 2021).

Therefore, Ad complexity showed that simple visuals and easy messages are easier to reproduce, but moderate ad complexity with creativity or information captures consumer interest (Bočaj & Ahtik, 2023). Clear and beautiful ads secured trust and oral repetition, highlighting the coherence of the broadcasted message (Casado-Aranda et al., 2022). Likes and click-through rates, therefore, support recall, showing that interactivity supported other measures put in place (Obal & Lv, 2017). In the last area, the competitive pressure was also highlighted by the issues of advertisement count; differentiation, branding harmony, and novelty features were noted as significant approaches to compete (Burke & Srull, 1988). In conclusion, the study confirms the

User Behavior-Ad Design-Recall relationship suggested in the current research and prior theories, such as the Wear-In/Wear-Out Theory that was postulated by Pechmann and Stewart in 1988.

### **5.2 Recommendations**

### **5.2.1 Optimize Frequency and Timing:**

It is recommended that advertisements be shown 3 to 5 times per week to optimize memory recall without causing ad fatigue. Research suggests that analytical insights into audience engagement can help fine-tune the frequency. Ad placements during peak hours, such as early evenings and weekends, may increase audience attention and interaction.

# 5.2.2 Personalize Content for Demographics:

Social media ads should be tailored to specific demographic preferences. Younger audiences tend to engage better with interactive or gamified ads, while older demographics may appreciate straightforward messaging and clear calls to action. Cultural and regional references in ads can further increase relevance and appeal.

### 5.2.3 Strategic Ad Placement:

To maximize ad effectiveness, it's important to align ad formats with platform strengths. For instance, static ads in newsfeeds enhance brand recall, while interactive ads in stories or reels are better suited for engagement and gamified campaigns. Premium ad spaces, such as top positions in feeds, should be prioritized to boost visibility and interaction.

# 5.2.4 Balance Simplicity and Creativity:

Advertisements should communicate messages in simple, clear terms, avoiding overcomplication. However, incorporating moderate creativity can capture attention and sustain engagement. A balanced approach can improve both recall and user engagement

### 5.2.5 Prioritize Ad Quality:

High-quality visuals and a consistent message are key to building trust and brand recognition. Engaging professional designers to ensure visually appealing and personalized content will enhance the ads' effectiveness and prevent them from becoming stale

### 5.2.6 Leverage Engagement to Boost Recall:

Ads that encourage user interaction—such as quizzes or polls—help increase engagement and recall. Features like likes, shares, and saves further enhance trust and credibility, contributing to higher engagement rates and more effective memory retention

### 5.2.7 Use Advanced Analytics:

Integrating advanced business intelligence tools and predictive analytics can refine targeting and personalization strategies. Real-time data on user behavior can help optimize ad placements and improve campaign performance by ensuring the right content reaches the right audience at the optimal time

## **5.3 Future Research Directions**

There are a number of limitations to this study; however, future research could examine the long-term effects of ad recall on consumers' brand loyalty and purchase intentions. Otherwise, expanding the analysis to include new ad formats, such as augmented reality ads, would provide a wider view of ads' efficacy in modern digital environments. Furthermore, cross-sectional comparison analysis could identify fresh ways of increasing ad performances across multiple social media platforms. Finally, a proper sample study on the key ethical issues of personalized advertisement, including data privacy, would give them a comprehensive outlook of the effects of digital marketing. Overall, following these recommendations and discussing further research, advertisers effectively develop continuous, strong, engaged, and trusted campaigns that influence the recall level and contribute to advertisers' success in the global challenging environment.

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#### TABLES

Table 1

Stages of Memory Storage in Atkinson and Shiffrin's Model

| Stage             | Capacity        | Duration           |
|-------------------|-----------------|--------------------|
| Sensory Memory    | Large           | Less than 1 second |
| Short-Term Memory | $7 \pm 2$ items | 20 seconds         |
| Long-Term Memory  | Unlimited       | Indefinite         |

Source: Atkinson and Shiffrin's (1968)

Table 2

| $\Gamma$ $\Gamma$ $\Lambda$ $\Gamma$ $\Lambda$ $\Gamma$ $\Lambda$ |              |
|---|--------------|
| ΕΛΓΙΛΥς ΙΝΤΗΡΝΓΙΝΟ ΜΡΜΛΥΥ ΚΡΙ   | $ri\rho var$ |
|   | icvai        |

| Factor             | Description                                  |
|--------------------|--|
| Contextual Cues    | Matching encoding and retrieval contexts     |
| Retrieval Practice | Repeated recall enhances long-term retention |
| Interference       | Competing information can hinder retrieval   |

Source: Compiled from studies on memory retrieval by Godden and Baddeley (1975), Roediger and Butler (2011), and Anderson and Neely (1996).

Table 3

| Number of Exposures | Retention Rate (%) |
|---------------------|--------------------|
| 1                   | 20                 |
| 3                   | 50                 |
| 5                   | 70                 |

Effects of Repetition on Memory Retention

| 7 | 85 |
|---|----|
|   |    |

## Source: Smolen, Zhang, & Byrne (2016)

#### Table 4

Summary of Factors Influencing Memory Retention in Advertising

| Factor                 | Effect on Memory Retention   | Key Study                      |
|------------------------|--|--------------------------------|
| Emotional Arousal      | Enhances delayed memory retention when matched with ad content                     | (Riemer & Noel, 2020)          |
| Media Context          | Relevant and engaging media contexts improve ad memory                             | (Kwon et al., 2019)            |
| Retrieval Cues         | Facilitate access to ad memory trace, improving recall and brand evaluations       | (Keller, 1987)                 |
| Scheduling and Spacing | Spaced repetition over one to three weeks enhances<br>brand recall and recognition | (Heflin & Haygood,<br>1985)    |
| Animation Speed        | Faster animation speeds in online ads enhance memory retention                     | (Detera et al., 2017)          |
| Social Context         | Presence of others enhances memory for socially desirable ads                      | (Puntoni &<br>Tavassoli, 2007) |

Source: Compiled from Riemer & Noel, 2020; Kwon et al., 2019; Keller, 1987; Heflin & Haygood, 1985; Detera et al., 2017; and Puntoni & Tavassoli, 2007.

#### Table 5

Summary of Key Findings on Ad Frequency and Memory Retention

| Study                     | Key Findings   |
|---------------------------|--|
| Stewart & Furse<br>(1986) | Moderate ad frequency (3-10 exposures) maximizes recall without causing wearout. |
| Hintzman (1974)           | Spaced repetitions enhance recall more than massed presentations.                |

| Schmidt<br>(2015) | & | Eisend | Optimal number of exposures is 3-10; excessive repetition can lead to ad wearout.                        |
|-------------------|---|--------|--|
| Riemer<br>(2020)  | & | Noel   | Emotionally arousing ads enhance delayed memory retention when<br>emotional intensity fits the ad claim. |

Source: Compiled from Stewart & Furse (1986); Hintzman (1974); Schmidt & Eisend (2015) and Riemer & Noel (2020)

## Table 6

Characteristics of Short-Term Memory

| Characteristic | Description  |
|----------------|--|
| Capacity       | $7 \pm 2$ items (Miller, 1956)                       |
| Duration       | Approximately 20 seconds (Peterson & Peterson, 1959) |
| Mechanism      | Rehearsal to maintain information                    |

Source: Compiled from Miller (1956) and Peterson & Peterson (1959)

Table 7

Types of Long-Term Memory and Frequency Effects

| Type of LTM       | Frequency Effect                                   |
|-------------------|--|
| Semantic Memory   | Enhanced through repeated exposure                 |
| Episodic Memory   | Strengthened by emotionally engaging repeated ads  |
| Procedural Memory | Developed through consistent branding              |
| Priming           | Increased likelihood of recognition and preference |

*Source: Compiled from: Popov & Reder (2021), Moreno et al. (2021), Coco et al. (2021), Tixier et al. (2021), Giglia et al. (2021), Mikhailova et al. (2021), Packard et al. (2020), Wu et al. (2022).* 

Table 8

Summary of Repetition Effects on Advertising Recall

| Study   | Key Findings  |
|---|---|
| Schmidt & Eisend<br>(2015)  | Recall increases linearly up to approximately ten exposures.  |
| Singh et al. (1994)   | Longer lags enhance recall in long delay conditions, shorter lags in short delay conditions.                      |
| Burke & Srull (1988)  | Repetition enhances recall only with little/no advertising for similar products due to competitive interference.  |
| Yaveroglu & Donthu<br>(2008)  | Varied repetitions are effective in non-competitive environments; single repetitions in competitive environments. |
| Appleton-Knapp et al. (2005)  | Spaced repetitions with varied contextual cues enhance recall, but too frequent changes can hinder retrieval.     |
| Pham and Avnet (2015)   | Strong emotional appeals required fewer repetitions to achieve high recall levels compared to neutral ad.         |
| Ho, Nguyen, and Vu<br>(2020)  | Spaced repetition significantly improves recall compared to massed repetition.                                    |
| Goldstein,McAfee,<br>and Suri (2013)Three to five exposures were optimal for brand recall. Beyon<br>range will led to diminishing returns and potential ad fatigue. |   |

Source: Compiled from Schmidt & Eisend (2015); Singh et al. (1994); Burke & Srull (1988); Yaveroglu & Donthu (2008); Appleton-Knapp et al. (2005); Pham and Avnet (2015); Ho, Nguyen, and Vu (2020); and Goldstein, McAfee, and Suri (2013)

Table 9

Key Characteristics of Static Banner Ads

| Characteristic | Explanation   | Study   |
|----------------|---|---|
| Format         | Non-dynamic content; lacks animation or interactivity | Simonetti & Bigné (2023); Muñoz-<br>Leiva et al. (2021); Casado-Aranda et<br>al. (2022) |

| Placement                | Position on webpage affects recall rates                           | Muñoz-Leiva et al. (2021); Namin et al.<br>(2020); Nguyen et al. (2020) |
|--------------------------|--|---|
| Visual Design            | Use of visual hierarchy, color contrast, and minimalistic design   | Rudy et al. (2020); Yang et al. (2021);<br>Wang et al. (2020)           |
| Psychological<br>Impact  | Activation of brain areas<br>associated with reward and<br>emotion | Casado-Aranda et al. (2022); Wang et al. (2020); Yang et al. (2021)     |
| Effectiveness<br>Metrics | Click-through rates, engagement,<br>and conversion rates           | Namin et al. (2020); Xie (2022); Lim et al. (2022)                      |

Source: Simonetti & Bigné (2023); Muñoz-Leiva et al. (2021); Casado-Aranda et al. (2022); Namin et al. (2020); Nguyen et al. (2020); Rudy et al. (2020); Yang et al. (2021); Wang et al. (2020); Xie (2022); Lim et al. (2022).

# Table 10

Comparison of Static, Dynamic, and Video Ads

| Characteristic          | Static Banner<br>Ads    | Dynamic<br>Ads           | Video Ads                                  | Study   |
|-------------------------|-------------------------|--------------------------|--|---|
| Visual Appeal           | High saliency<br>needed | Motion and interactivity | Audio-visual<br>elements<br>enhance appeal | Rudy et al. (2020);<br>Namin et al. (2020);<br>Bellman et al. (2020)                    |
| User<br>Engagement      | Moderate                | High                     | Very High                                  | Muñoz-Leiva et al.<br>(2021); Zhai & Chen<br>(2023); Ausin-Azofra<br>et al. (2021)      |
| Memory<br>Retention     | Moderate                | High                     | Very High                                  | Casado-Aranda et al.<br>(2022); Yang et al.<br>(2021); Bellman et al.<br>(2020)         |
| Psychological<br>Impact | Limited                 | Moderate                 | Strong                                     | Casado-Aranda et al.<br>(2022); Bellman et al.<br>(2020); Ausin-Azofra<br>et al. (2021) |

| conversion rates Bellman et al. (2020) | Effectiveness<br>Metrics | CTR,<br>engagement,<br>conversion rates | CTR,<br>engagement | Viewing<br>engagemen | time,<br>t | Namin et al.<br>Zhai & Chen<br>Bellman et al. | (2020);<br>(2023);<br>(2020) |
|--|--------------------------|---|--------------------|----------------------|------------|---|------------------------------|
|--|--------------------------|---|--------------------|----------------------|------------|---|------------------------------|

Source: Compiled from Rudy et al. (2020); Namin et al. (2020); Bellman et al. (2020); Muñoz-Leiva et al. (2021); Zhai & Chen (2023); Ausin-Azofra et al. (2021); Casado-Aranda et al. (2022); Yang et al. (2021).

Table 11

| Var | Ein din an | an Davian | El anna anta | of Chartin | Darress | 11- |
|-----|------------|-----------|--------------|------------|---------|-----|
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| Design<br>Element     | Impact on Ad Effectiveness   | Key Studies  |
|-----------------------|--|--|
| Color and<br>Contrast | Blue ads and high contrast improve visibility<br>and click-through rates               | (North & Ficorilli, 2017)                                |
| Imagery and<br>Text   | Clear, relevant images and concise text with a strong CTA enhance engagement           | (Xie, 2022)  |
| Ad Size and Position  | 300×250 size and top/center page placement maximize visibility and clicks              | (North & Ficorilli, 2017),<br>(Muñoz-Leiva et al., 2021) |
| Information<br>Layout | Matrix-style layouts improve user engagement<br>and attractiveness                     | (Zhai & Chen, 2023)                                      |
| Visual<br>Complexity  | Simple designs outperform complex ones in terms of attention retention and user appeal | (Bočaj & Ahtik, 2023)                                    |

Source: Compiled from North & Ficorilli, 2017; Xie, 2022; Muñoz-Leiva et al., 2021; Zhai & Chen, 2023; and Bočaj & Ahtik, 2023.

Table 12

Key Findings on Text and Copywriting in Banner Ads

| Characteristic          | Impact on Ad Effectiveness                     | Key Studies          |
|-------------------------|--|----------------------|
| Conciseness and Clarity | Reduces cognitive load and enhances engagement | (Namin et al., 2020) |

| Compelling Call-to-<br>Action | Increases click-through rates                       | (Bruce, 2017)                    |  |
|-------------------------------|---|----------------------------------|--|
| Use of Keywords               | Improves visibility and relevance                   | (Xie, 2022)                      |  |
| Emotional Appeal              | Enhances user attention and engagement              | (Pasqualotti & Baccino,<br>2014) |  |
| Font Size and Style           | Improves readability and engagement                 | (Brown, 2002)                    |  |
| Text Placement                | Ensures visibility and effectiveness of the message | (Namin et al., 2020)             |  |

Source: Compiled from Namin et al., 2020; Bruce, 2017; Xie, 2022; Pasqualotti & Baccino, 2014; Brown, 2002; and Namin et al., 2020.

### Table 13

Key Findings on Use of Colors and Images in Banner Ads

| Design Element                  | Impact on Ad Effectiveness                            | Key Studies               |  |
|---------------------------------|---|---------------------------|--|
| Color Contrast                  | Enhances visibility and readability (Xie, 2022)       |                           |  |
| Specific Colors (e.g.,<br>Blue) | Generates more clicks due to emotional associations   | (North & Ficorilli, 2017) |  |
| Image Quality and<br>Relevance  | Enhances engagement and recall                        | (Huhmann, 2003)           |  |
| Visual Complexity               | Moderate complexity is optimal for user<br>engagement | (Huhmann, 2003)           |  |
| Image-Text Integration          | Longer fixation times and improved recall             | (Bočaj & Ahtik,<br>2023)  |  |

Source: Compiled from Xie, 2022; North & Ficorilli, 2017; and Huhmann, 2003.

Table 14

Average Click-Through Rates by Industry

| Industry   | Average CTR (%) |
|------------|-----------------|
| Retail     | 0.47            |
| Technology | 0.84            |
| Finance    | 0.33            |
| Travel     | 0.56            |

Source: Chaffey & Ellis-Chadwick (2020).

#### Table 15

Key Metrics for Measuring Banner Ad Effectiveness on Brand Awareness

| Metric                   | Impact on Brand Awareness                                   | Key Studies  |
|--------------------------|---|--|
| Brand Recall             | Higher recall with well-placed, engaging ads                | (Namin, Hamilton, & Rohm, 2020)                                |
| Visual Attention         | Strategic positioning increases attention and recall        | (Muñoz-Leiva, Liébana-Cabanillas, &<br>Hernández-Méndez, 2018) |
| Frequency of<br>Exposure | Repeated exposures enhance memory retention and recall      | (Lee, Ahn, & Park, 2015)                                       |
| Emotional Appeal         | Emotional ads create positive brand attitudes and awareness | (Hussain, Ferdous, & Mort, 2018)                               |
| User Engagement          | Interactive ads enhance recall and recognition              | (Obal & Lv, 2017)  |

Source: Compiled from Namin, Hamilton, & Rohm, 2020; Muñoz-Leiva, Liébana-Cabanillas, & Hernández-Méndez, 2018; Lee, Ahn, & Park, 2015; Hussain, Ferdous, & Mort, 2018; and Obal & Lv, 2017.

Table 16

Key Metrics for Measuring Banner Ad Effectiveness on Consumer Behavior and Engagement

| Metric                      | Impact on Consumer Behavior and<br>Engagement  | Key Studies  |  |  |
|-----------------------------|--|--|--|--|
| Click-Through<br>Rate (CTR) | Measures direct engagement by tracking how often users click on the ad                                   | Chaffey & Ellis-Chadwick<br>(2019); Yang & Ghose<br>(2010) |  |  |
| Conversion Rate             | Indicates the percentage of users who<br>complete a desired action after clicking the ad                 | Batra & Keller (2019)                                      |  |  |
| Impressions and<br>Reach    | Reflects the total number of ad displays and<br>unique viewers, impacting brand visibility<br>and recall | d Goldfarb & Tucker (2011)                                 |  |  |
| Cost Per Click<br>(CPC)     | Evaluates cost-efficiency by calculating the cost for each click   | Chen et al. (2017)   |  |  |
| Viewability                 | Measures whether the ad was actually seen by<br>users, ensuring ad effectiveness                         | IAB (2019)   |  |  |
| Ad Recall                   | Assesses how well users remember the ad and brand post-exposure  | Batra & Keller (2019);<br>Drèze & Hussherr (2003)          |  |  |
| Brand Lift                  | Measures changes in brand perception and<br>purchase intent before and after the ad<br>campaign          | Li & Lo (2015)   |  |  |
| Bounce Rate                 | Indicates the percentage of users who leave<br>the landing page without further interaction              | Chaffey & Ellis-Chadwick<br>(2019)                         |  |  |

Source: Compiled from Chaffey & Ellis-Chadwick (2019); Yang & Ghose (2010); Batra & Keller (2019); Goldfarb & Tucker (2011); Chen et al. (2017); IAB (2019); Drèze & Hussherr (2003); Li & Lo (2015) & Montaner (2018).

Table 17

Overview of Key Social Media Platforms for Advertising

| Platform       | Monthly<br>Active<br>Users<br>(2021) | Key Features                                      | Primary<br>Advertising<br>Strengths                                    | Key Studies  |
|----------------|--------------------------------------|---|--|--|
| Facebook       | 3.065 billion                        | Detailed<br>targeting,<br>Facebook Ads<br>Manager | Brand loyalty,<br>personalized content,<br>robust analytics            | Dehghani et al. (2016); Chen<br>et al. (2012); Araujo et al.<br>(2015)             |
| Instagram      | 2 billion                            | Visual content,<br>Stories, IGTV                  | Visual storytelling,<br>high engagement,<br>shoppable posts            | Jin & Ryu (2018); Lou et al.<br>(2019); Sheldon & Bryant<br>(2016)                 |
| X /<br>Twitter | 611 million                          | Real-time tweets,<br>hashtags                     | Real-time marketing,<br>customer<br>engagement, trend<br>participation | Fischer & Reuber (2014);<br>Rauschnabel et al. (2017);<br>Liu et al. (2017)        |
| LinkedIn       | 770 million                          | Professional<br>network,<br>Sponsored<br>Content  | B2B marketing, lead<br>generation,<br>professional<br>credibility      | Dwivedi et al. (2015); Ma et<br>al. (2019); Swani et al.<br>(2014)                 |
| TikTok         | 1.582 billion                        | Viral content,<br>Branded Hashtag<br>Challenges   | High engagement,<br>user-generated<br>content, creative ad<br>formats  | Omar & Dequan (2020);<br>Wongkitrungrueng &<br>Assarut (2020); Li et al.<br>(2020) |

Source: Statista (2024); Dehghani et al. (2016); Jin & Ryu (2018); Fischer & Reuber (2014); Dwivedi et al. (2015); Omar & Dequan (2020).

Table 18

Summary of Key Studies on Frequency Capping in Social Media Advertising

| Study           |   |        | Platform(s) | Optimal<br>Frequency Cap | Key Findings  |
|-----------------|---|--------|-------------|--------------------------|---|
| Lewis<br>(2014) | & | Reiley | Facebook    | 3-4<br>exposures/week    | Improved engagement and reduced ad fatigue with frequency capping |

| Sahni (2016)                         | Various | 3-5<br>exposures/week     | Prevented ad fatigue, increased<br>perceived relevance, and enhanced user<br>engagement                    |
|--------------------------------------|---------|---------------------------|--|
| Lambrecht &<br>Tucker (2013)         | Various | Personalized<br>frequency | Higher click-through and conversion<br>rates with personalized ads under<br>frequency capping              |
| Todri &<br>Adamopoulos<br>(2021)     | Various | 3-5<br>exposures/week     | Reduced ad fatigue, optimal frequency<br>caps vary by platform and format,<br>continuous adjustment needed |
| De Haan, Wiesel, &<br>Pauwels (2016) | Various | 3-4<br>exposures/week     | Enhanced engagement with<br>personalized frequency capping,<br>reduced ad burnout                          |
| Zhang & Wedel<br>(2009)              | Various | 3-4<br>exposures/week     | Optimized ad effectiveness and user<br>satisfaction with frequency capping and<br>personalization          |
| Bruce, Peters, &<br>Naik (2012)      | Various | Dynamic capping           | Importance of adapting frequency caps to user behavior and preferences                                     |
| Brasel & Gips<br>(2014)              | Various | Moderate<br>frequency     | Highlighted the negative impact of ad saturation without capping   |
| Tucker (2014)                        | Various | Moderate<br>frequency     | Balanced ad exposure and improved<br>user experience with frequency capping                                |

Source: Compiled from Lewis & Reiley (2014); Sahni (2016); Lambrecht & Tucker (2013); Todri & Adamopoulos (2021); De Haan, Wiesel, & Pauwels (2016); Zhang & Wedel (2009); Bruce, Peters, & Naik (2012); Brasel & Gips (2014); Tucker (2014).

Table 19

Key Factors Influencing Memory Retention of Ads on Social Media

| Factor Impact on Memory<br>Retention | Key Studies |
|--------------------------------------|-------------|
|--------------------------------------|-------------|

| Emotional<br>Content | Enhances recall due to emotional engagement   | Bolls, Muehling, & Yoon (2018); Bakker & Rickard (2018)                                 |
|----------------------|---|---|
| Ad Frequency         | Moderate frequency optimizes recall           | Stocchi, Driesener, & Nenycz-Thiel (2015);<br>Campbell & Marks (2015)                   |
| Visual Content       | High-quality images and videos improve recall | Jin & Ryu (2018); Lou, Xie, & Feng (2019);<br>Sheldon & Bryant (2016)                   |
| Personalization      | Increases relevance and memory retention      | Bleier & Eisenbeiss (2015); Lee, Hosanagar,<br>& Nair (2018); Lambrecht & Tucker (2013) |

Source: Compiled from Bolls, Muehling, & Yoon (2018); Stocchi, Driesener, & Nenycz-Thiel (2015); Jin & Ryu (2018); Bleier & Eisenbeiss (2015).

### Table 20

|    |              |         | _        |         |            |              | _           |           | _      |     |
|----|--------------|---------|----------|---------|------------|--------------|-------------|-----------|--------|-----|
| Va | . Idontified | Canain  | Dagaguah | an Ad L | The allene | n and Manaar | , Dotontion | of Statio | Danaan | Ada |
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|    |              |         |          |         |            | ,            | ,           |           |        |     |

| Identified Gap                                | Explanation  | Key Studies Indicating Gap   |
|---|--|--|
| Optimal frequency for static ads              | Limited differentiation between static<br>and dynamic ad formats in frequency<br>studies                 | Brasel & Gips (2014);<br>Campbell & Marks (2015);<br>Wiese & Döring (2021)     |
| Demographic and<br>psychographic<br>variables | Insufficient consideration of how<br>different audience segments respond to<br>ad frequency              | Bleier & Eisenbeiss (2015);<br>Jin & Ryu (2018); Dehghani<br>et al. (2016)     |
| Longitudinal impact                           | Scarcity of studies assessing long-term<br>effects of ad frequency on memory<br>retention                | Stocchi, Driesener, &<br>Nenycz-Thiel (2015); Li & Lo<br>(2015); Tucker (2014) |
| Interplay between ad quality and frequency    | Limited research on how content<br>quality influences recall when<br>combined with different frequencies | Dehghani et al. (2016); Li &<br>Lo (2015); Bleier &<br>Eisenbeiss (2015)       |
| Ad fatigue thresholds                         | Underexplored thresholds for ad fatigue specific to static banner ads                                    | Wiese & Döring (2021);<br>Tucker (2014)  |

| Cognitive processes in static ads            | Lack of focus on cognitive mechanisms influencing static banner ad recall  | Casado-Aranda et al. (2022)                                     |
|--|--|---|
| Interaction of<br>placement and<br>frequency | Insufficient data on how placement and frequency interact to affect recall | Muñoz-Leiva et al. (2021);<br>Todri et al. (2020)               |
| Social proof and ad memory                   | Need for empirical studies on social dynamics affecting static ad recall   | Sanak-Kosmowska (2020);<br>Zimmerman & Brown-<br>Schmidt (2020) |
| Frequency capping<br>strategies              | Lack of specific strategies for static banner ads                          | Romberg et al. (2020); Lim et al. (2022)                        |

Sources: Compiled from Brasel & Gips (2014); Campbell & Marks (2015); Bleier & Eisenbeiss (2015); Jin & Ryu (2018); Stocchi, Driesener, & Nenycz-Thiel (2015); Wiese & Döring (2021); Dehghani et al. (2016); Li & Lo (2015); Tucker (2014); Casado-Aranda et al. (2022); Muñoz-Leiva et al. (2021); Todri et al. (2020); Wu (2023); Wei et al. (2020); Sanak-Kosmowska (2020); Zimmerman & Brown-Schmidt (2020); Romberg et al. (2020); Lim et al. (2022).

### Table 21:

Key Findings on Ad Frequency and Memory Retention of Static Banner Ads

| Key Finding                | Explanation  | Key Studies  |  |
|----------------------------|--|--|--|
| Ad placement<br>and recall | Ads in prominent positions have higher recall rates                            | Muñoz-Leiva et al. (2021); Namin et al. (2020); Nguyen et al. (2020)       |  |
| Content quality impact     | Hedonic ads enhance recall more than utilitarian ads                           | Casado-Aranda et al. (2022); Wang et al. (2020); Yang et al. (2021)        |  |
|                            | High-quality visuals and<br>engaging content can sustain<br>higher frequencies | Jin & Ryu (2018); Dehghani et al. (2016);<br>Lee, Hosanagar, & Nair (2018) |  |
| Frequency and irritation   | Excessive ad repetition leads to ad fatigue                                    | Todri et al. (2020); Lim et al. (2022); Xie<br>(2022)                      |  |

| Optimal<br>Frequency   | 3-4 exposures per week enhance<br>recall without causing ad fatigue       | Campbell & Marks (2015); Brasel & Gips (2014); Li & Lo (2015)   |  |
|------------------------|---|---|--|
| Personalized<br>ads    | Personalized ads enhance<br>engagement and recall                         | Bleier & Eisenbeiss (2015); Jilcha & Kwak<br>(2022); Wooley et al. (2022); Lee,<br>Hosanagar, & Nair (2018); Lambrecht &<br>Tucker (2013) |  |
| User interaction       | Recommendations and comments improve ad recall                            | Sanak-Kosmowska (2020); Motoki et al. (2020); Wang et al. (2020)  |  |
| Creativity in design   | Creative ads with high visual saliency improve recognition                | Yang et al. (2021); Nguyen et al. (2020);<br>Hong et al. (2021)   |  |
| Ad Fatigue             | High ad frequencies lead to user<br>annoyance and decreased<br>engagement | Wiese & Döring (2021); Tucker (2014);<br>Stocchi, Driesener, & Nenycz-Thiel (2015)  |  |
| Longitudinal<br>Impact | Need for understanding long-<br>term effects of repeated ad<br>exposures  | Stocchi, Driesener, & Nenycz-Thiel<br>(2015); Li & Lo (2015); Dehghani et al.<br>(2016)   |  |

Source: Compiled from Muñoz-Leiva et al. (2021); Namin et al. (2020); Nguyen et al. (2020); Casado-Aranda et al. (2022); Wang et al. (2020); Yang et al. (2021); Jin & Ryu (2018); Dehghani et al. (2016); Lee, Hosanagar, & Nair (2018); Todri et al. (2020); Lim et al. (2022); Xie (2022); Campbell & Marks (2015); Brasel & Gips (2014); Li & Lo (2015); Bleier & Eisenbeiss (2015); Jilcha & Kwak (2022); Wooley et al. (2022); Lambrecht & Tucker (2013); Sanak-Kosmowska (2020); Motoki et al. (2020); Hong et al. (2021); Wiese & Döring (2021); Tucker (2014); Stocchi, Driesener, & Nenycz-Thiel (2015).